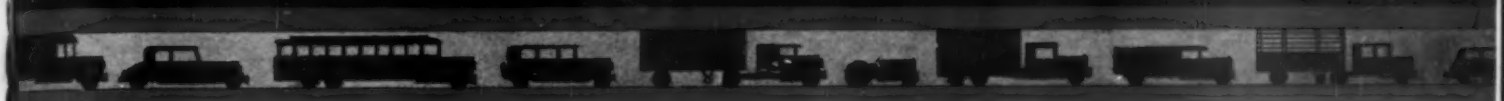
JUNE
1932

FLEET OWNER

THE FERGUSON PUBLISHING CO., 90 WEST ST., NEW YORK, N.Y.

Devoted to the Better Operation and Maintenance of Truck, Bus, Taxicab, Passenger Car and All Automotive Fleets



JUN 14 '32

We Feature This Month . . . . . .

- Truck Costs on West Coast
- Servicing "Flying Red Fleet"
- More on Reducing Tire Costs
- Pie Fleet Has "Mother Ship"
- "How-to-Do-It" Articles
- Question-of-the-Month Club

—and Our Usual Departments

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Cut down engine revolutions per trip—

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FORD AA TRUCK OWNERS

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THIS new Almetal unit is for Ford AA Trucks built after August 1, 1929. The new 1932 Ford Truck uses the same efficient type joint consisting of a two-joint installation. The Almetal assembly consists of a front joint, a TUBULAR shaft to eliminate weight and "whipping," and a housing, as illustrated. Complete assembly individually boxed. No cutting, welding or machine work to install. No additional holes or changes in frame required. Installation time same as for obsolete gear coupling.

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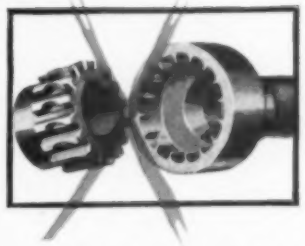

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The

FLEET OWNER

Published Monthly in the interests of Automotive Fleet Owners who maintain their own Repair and Service Shops and devoted to the better Operation and Maintenance of Truck, Trailer, Bus, Passenger Car, Taxicab and all Automotive Fleets.

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The FLEET OWNER

JUNE
1932

Co-ordination — the Keynote . . . . . .

The Editor's Page

IT was our good fortune to attend a meeting recently, at which several fleet maintenance men took the opportunity to rid their chests of those little somethings that bother even the best of us at times. One of the principal victims of attack was the time-honored one of Co-ordination, or lack of it. Not among fleet operators' personnel, but as applied to the truck maker and his partners-in-manufacture, the engine, axle, clutch, transmission and other unit builders.

Our own editorial observations lead us to believe that at the present time the subject of Co-ordination is getting more attention than ever. Axle makers are working hand-in-hand with brake-system builders. Engine, body, tire and truck manufacturers are having their share of cooperative conferences, too.

Salesmen's recommendations are now followed up by real engineering facts, dug up out of the mystery box of the manufacturer or assembler. Unit makers are not content to just sell their stuff, but are paying real attention to actual field problems, even going so far as to send service men out into the scene of action in order to get first hand dope as to how their units are performing. All of which is as it should be, for no two operations of truck or bus fleets are as alike as peas in a pod.

But the operators can also play their co-ordinative parts, in several ways. One way is not to expect too much tonnage capacity for a low price. Another way is by expressing your exact requirements thoroughly, because there is no such thing as "average conditions." When salesmen attempt to furnish something to fit your particular needs, do not hide anything. Don't forget to remember those extra heavy loads, or that long grade on "Marcelled Curve." And the fact that you sometimes expect to hitch on a heavily loaded trailer when Bill Smith is on his vacation.

Perhaps our enthusiasm has caused us to run wild with admonitions, but we can't resist the temptation of advising you to heed the recommendations of your vehicle and unit makers. They give you the benefits of intensive engineering, research and experience with problems like yours that exist all over the country. Call them in next time you are in doubt, and if it is not settled in the office it can be hashed out in the shop or on the road. Co-ordination is the keynote of successful manufacturing, purchasing, operation and maintenance.

How We Figure Our Cost Data

By C. G. Anthony

(President, Pacific Freight Lines, Los Angeles, Calif.)

THE actual cost of operating a truck is dependent upon many factors. The cost will vary with the type of equipment used. The size and load carried enters into the equasion. The cost will also vary with the typography of the region in which operated, the congestion in a given region, the buying power of the owner, the care of the equipment and methods of accounting used in establishing costs.

Actual costs are problematical, but average costs are readily compiled. The greater the number of trucks studied, the greater the miles traveled, the wider the area of operations, the more accurate the averages.

In the following study, the records of 87 trucks and 87 trailers were used. These trucks operated from Los Angeles to the Harbor, the Imperial Valley, up the coast to San Luis Obispo, over the Ridge Route as far north as Fresno and south to San Diego, covering over 350,000 miles monthly. Accurate costs were kept of the operation of each piece of equipment from day to day, so that the yearly averages were readily obtainable. A composite picture of these operations is presented in the accompanying tables.

The cost of operating these motor trucks and trailers is placed under two headings "Fixed Charges" and "Variable costs." The fixed charges include interest on investment, insurance, garage, license and driver's salary. The variable costs cover gasoline, oil, grease, repairs, tires and depreciation. The fixed charges vary inversely with the mileage traveled, while the variable costs vary directly with the mileage traveled. Because of this inverse variation of the fixed charges, it is impossible to state the cost per mile unless we know the miles traveled.

Table 1 on this page shows the daily fixed charges of various capacity trucks and trailers ranging from 2-ton to 10-ton equipment. Interest is figured at 6 per cent yearly on the average investment. Insurance charges are taken from quotations of the Automobile Club and checked against actual experience. License charges are those fixed by law for California.

Amounts allotted to wages are predicated upon information gained from drivers now working for Pacific Freight Lines, but formerly in the employ of contract haulers and from many drivers applying for positions.

The wage scale set forth in Table 1 is less than that actually being paid by Pacific Freight Lines, and was reduced intentionally to produce a figure so low that it would be free from the criticism that drivers could be obtained for less than the wage scale set forth in this table. Because of scarcity of work and the unemployment problem, drivers are willing to work at the present time on this wage scale. Where drivers are paid by the trip rather than by the day, the wages received closely approximate the amounts used in Table 1.

Table 2 on the following page sets forth the vari-

Table 1.

AVERAGE TRUCK and TRAILER DAILY FIXED CHARGES

Capacity	2-Ton Truck	3-Ton Truck	4-Ton Truck	5-Ton Truck	6-Wheel 10-Ton Truck	4-Wheel 8-Ton Trailer	6-Wheel 12-Ton Trailer
Weight(less body) lbs.	4900	5900	7600	8800	12,000	4500	7500
Interest 6% - 4-yr. life	.191	.310	.450	.560	.833	.150	.240
Fire Insurance	.033	.053	.078	.100	.151	.015	.027
Prop.Dmg. & Liab.(5 & 10)	.296	.296	.383	.383	.383	.061	.081
Compensation Insurance	.396	.396	.433	.468	.468	---	---
Garage	.500	.500	.500	.750	.750	.500	.500
License	.143	.143	.143	.177	.243	.143	.243
Wages	5.384	5.384	6.000	6.456	6.500	---	---
Totals (Per Day)	6.943	7.082	7.987	8.894	9.328	.869	1.091
Total Investment	$1910	$3100	$4500	$5600	$8328	$1500	$2400

Table 2.

AVERAGE TRUCK and TRAILER VARIABLE CHARGES

Capacity	2-Ton	3-Ton	4-Ton	5-Ton	6-Wheel 10-Ton	4-Wheel Trailer	6-Wheel Trailer
Gasoline	.016	.020	.022	.024	.045	.010	.015
Lubricants	.002	.002	.003	.003	.005	.001	.002
Tires (Trks.30,000 Mi.) (Trlr.40,000 Mi.)	.007	.010	.016	.016	.028	.012	.025
Maintenance	.025	.030	.033	.035	.048	.003	.004
Depreciation (Trks.100,000 Mi.) (Trlr.250,000 Mi.)	.017	.027	.041	.051	.075	.004	.005
Total Per Mile	.067	.089	.115	.129	.201	.030	.051
Payload Capacity in Tons	4	6	6	5.6	10	8	12

able costs for the same equipment. Gasoline is figured at 12 cents per gallon, lubricants charged at actual cost to Pacific Freight Lines, tires at list of March 10, 1932, less 10 per cent, allowing 30,000 miles for pneumatics on trucks and 40,000 miles on trailers. Maintenance is actual experience. Depreciation is figured on a mileage basis, allowing a life of 100,000 miles for trucks and 250,000 miles for trailers. Depreciation may be charged off on either a yearly or a mileage basis. On a time basis depreciation is assumed to be a fixed charge; on a mileage basis it becomes a variable cost. I regard the mileage basis as more accurate as it does not charge an idle truck with the same rate as the truck doing 200 to 300 miles daily.

It has been my experience that maintenance plus depreciation for 100,000 miles just about equals maintenance plus depreciation figured on a 200,000-mile

Table 3.

COST PER MILE of OPERATION of AVERAGE TRUCK and TRAILER of VARIOUS CAPACITY for VARIOUS DISTANCES

Miles	2-Ton Truck	3-Ton Truck	4-Ton Truck	5-Ton Truck	6-Wheel 10-Ton Truck	4-Wheel Trailer	6-Wheel Trailer
10	.761	.797	.914	1.018	1.134	.117	.160
20	.414	.443	.514	.574	.667	.073	.106
30	.298	.325	.381	.425	.512	.059	.087
40	.241	.266	.313	.351	.434	.052	.078
50	.206	.231	.275	.307	.388	.047	.073
60	.183	.207	.248	.277	.356	.044	.069
70	.166	.190	.229	.256	.334	.042	.067
80	.154	.178	.215	.240	.318	.041	.065
90	.144	.168	.204	.228	.305	.040	.063
100	.136	.160	.195	.218	.294	.039	.062
110	.130	.153	.188	.210	.286	.038	.061
120	.125	.148	.182	.203	.279	.037	.060
130	.120	.143	.176	.197	.273	.037	.059
140	.117	.140	.172	.193	.268	.036	.059
150	.113	.136	.168	.188	.263	.036	.058
160	.110	.133	.165	.185	.259	.035	.058
170	.108	.131	.162	.181	.256	.035	.057
180	.106	.128	.159	.178	.253	.035	.057
190	.104	.126	.157	.176	.250	.035	.057
200	.102	.124	.155	.175	.248	.034	.056
210	.100	.123	.153	.171	.245	.034	.056
220	.099	.121	.151	.169	.243	.034	.056
230	.097	.120	.150	.168	.242	.034	.056
240	.096	.119	.148	.166	.240	.034	.056
250	.095	.117	.145	.165	.238	.033	.055

basis. As the number of miles allotted to the life of a truck are increased, the depreciation per mile decreases but this reduction of depreciation cost is offset by the fact that maintenance increases. This is due to the fact that a moving part is a wearing part and has a definite life. After a given number of motions the part is worn to an unusuable condition and must be renewed.

To arrive at the cost of operating a given truck a given number of miles both Tables 1 and 2 must be used to get the answer. For example: Let us say that a 5-ton truck carrying a 5½-ton payload and pulling a 4-wheel trailer carrying an 8-ton payload travels from Los Angeles to San Diego, a distance of 126 miles, discharges its cargo and returns to Los Angeles empty. What is the cost of this operation?

To determine the total cost, add the fixed charge of the truck or $8.89 (Table 1, Column 5) to the fixed cost of the trailer, or .87 (Table 1, Column 7) giving a total of $9.76. The variable cost will be $.129 per mile for the truck (Table 2, Column 5) plus $.03 for the trailer (Table 2, Column 7), or a total variable of $.159 per mile, and for 126 miles the total variable cost will be $20.03.

Table 4.

COST per TRIP of AVERAGE TRUCK and TRAILER OPERATION of VARIOUS CAPACITY for VARIOUS DISTANCES

Miles	2-Ton Truck	3-Ton Truck	4-Ton Truck	5-Ton Truck	6-Wheel 10-Ton Truck	4-Wheel Trailer	6-Wheel Trailer
10	7.61	7.97	9.14	10.18	11.34	1.17	1.60
20	8.28	8.86	10.28	11.48	13.34	1.46	2.12
30	8.94	9.75	11.43	12.75	15.36	1.77	2.61
40	9.64	10.64	12.52	14.04	17.36	2.08	3.12
50	10.30	11.55	13.75	15.35	19.40	2.35	3.65
60	10.98	12.42	14.88	16.62	21.36	2.64	4.14
70	11.62	13.30	16.03	17.92	23.38	2.94	4.69
80	12.32	14.24	17.20	19.20	25.44	3.28	5.20
90	12.96	15.12	18.36	20.52	27.45	3.60	5.67
100	13.60	16.00	19.50	21.80	29.40	3.90	6.20
110	14.30	16.83	20.69	23.10	31.46	4.18	6.71
120	15.00	17.76	21.84	24.36	33.48	4.44	7.20
130	15.60	18.59	22.88	25.61	35.49	4.81	7.67
140	16.38	19.60	24.08	27.02	37.52	5.04	8.26
150	16.95	20.40	25.20	28.20	39.45	5.40	8.70
160	17.60	21.28	26.40	29.60	41.44	5.60	9.28
170	18.36	22.27	27.54	30.77	43.52	5.95	9.69
180	19.08	23.04	28.62	32.04	45.54	6.30	10.26
190	19.76	23.94	29.83	33.44	47.50	6.65	10.83
200	20.40	24.80	31.00	34.60	49.60	6.80	11.20
210	21.00	25.63	32.13	35.91	51.45	7.14	11.76
220	21.78	26.62	33.22	37.18	53.46	7.48	12.32
230	22.31	27.60	34.50	38.64	55.66	7.82	12.88
240	23.04	28.56	35.52	39.84	57.60	8.16	13.44
250	23.75	29.25	36.25	41.25	59.50	8.25	13.75

The total operating cost will then be —
$9.76—the fixed charge, plus
$20.03—the variable cost, or

$29.79—to haul 13½ tons 126 miles

The equipment returns to Los Angeles empty, so the round trip costs 2 x 29.79 or $59.58.

The average contract rate to San Diego is 15 cents for 100 lbs. or $3.00 per ton. The revenue returned for hauling 13½ tons at $3.00 per ton equals $40.50, an amount showing a profit of $10.71 on the haul to San Diego, but a loss of $19.08 after the equipment has returned to Los Angeles empty; therefore, a return cargo or back haul must be obtained to make a 15 cent per 100 rate profitable.

To eliminate the necessity of multiplication and

(Please turn to page 50)

This HEAVY DUTY Lining
1 Asbestos metallic yarn combined with plastic metal wire.
2 The fabricated material in its first stage after weaving on heavy duty looms.
SILVER EDGE
Raybestos
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An entirely new, exclusive process subjects RAYBESTOS SILVER EDGE F-W HEAVY DUTY LINING to an hydraulic pressure of 2,500 pounds per square inch during one of its stages of manufacture! Such pressure, combined with the highest quality of materials, is just one of the reasons for its Herculean durability.

Fleet owners, drivers and mechanics are enthusiastic about the performance of this new lining. It can be relied on to do the job efficiently, economically. Familiarize yourself with the really remarkable qualities of RAYBESTOS SILVER EDGE F-W HEAVY DUTY BRAKE LINING today. Learn how its unique exclusively-Raybestos construction produces its uniformly high co-efficient of friction. It is flexible. Comes in rolls. Can be used on either steel or cast iron drums without danger of scoring. Makes brakes of older types perform with 1932 efficiency. Let us send you all the facts. Write today.

THE RAYBESTOS DIVISION
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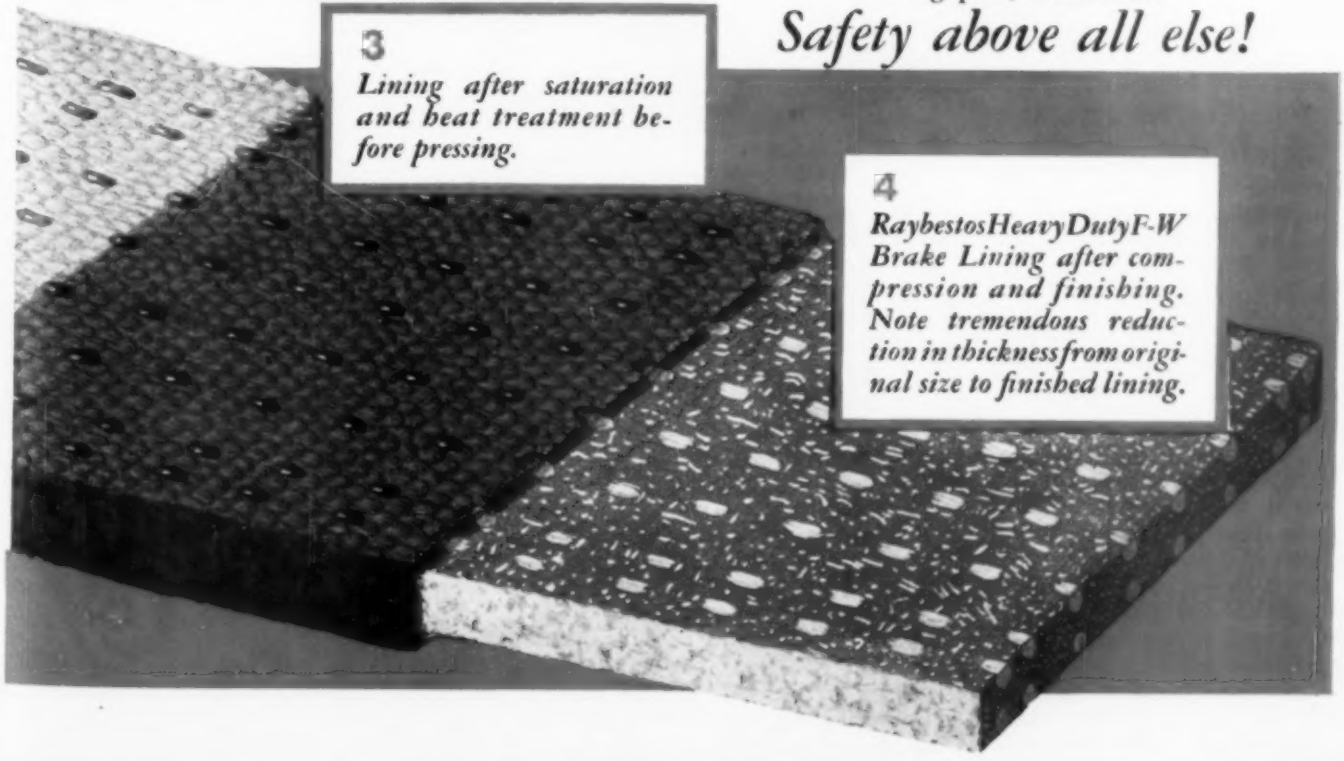
Safety above all else!



3
Lining after saturation and heat treatment before pressing.

4
Raybestos Heavy Duty F-W Brake Lining after compression and finishing. Note tremendous reduction in thickness from original size to finished lining.

Keeping "Flying Red Fleet" on the Road

Detroit's Deluxe Bus Fleet Gets Good Maintenance and Piles Up Mileage Record That Makes Transportation History

IN three years and four months of day and night operation, Detroit's famous "flying red buses" have made passenger transportation history.

Figures just taken from the operating and revenue sheets of the City of Detroit Department of Street Railways reveal that this fleet of deluxe buses has carried a total of 17,312,912 passengers and rolled up an accumulation of 11,860,993 miles without a single fatal accident.

The first buses, delivered to the Department of Street Railways were put in operation on Thanksgiving Day, November 25, 1928, on Woodward, Jefferson and Mack Avenues. The impressive figures given above cover operations to February 13, 1932.

A typical vehicle in Detroit's deluxe bus fleet which is often called the "Flying Red Buses." (What appears to be a broken window in the door is not such, but is a blur on the negative that escaped our notice.—Ed.)

This deluxe transportation service, as far as can be learned, operates on the fastest city bus schedule in the world. In the fleet are 120 deluxe, 15-passenger parlor coaches. The red buses are routed over the most congested streets and required to keep to schedules in all kinds of weather. They have kept going under all conditions, over icy pavements, through rain, snow, fog, hail and sleet. Detroiters depend on the red buses like New Yorkers depend on the subway express trains. The service has been popular since the day it was started.

Detroit's deluxe bus fleet is maintained mechanically in much the same manner as the rolling stock used on the crack limited trains and model street car lines. Each bus undergoes a regular inspection every 1,000, 9,000, and 15,000 miles. In addition, each driver reports the exact mechanical condition of his vehicle when he turns it in at the garage at the end of his run. Practically every working part is checked at the weekly or 1,000-mile inspection. Every 9,000 miles each vehicle gets a special chassis inspection and every 15,000 miles a special engine inspection. Thus the fleet of buses is kept in good mechanical condition at all times with a minimum of road delays.

Many of the original red bus drivers still are behind the wheel after more than three years. They are regarded as being among the most proficient drivers of commercial passenger carrying motor vehicles in the world. Famous race drivers and aviators have remarked frequently that, in their way, the red bus pilots are as skillful and alert as the much publicized aces of the air and race courses.

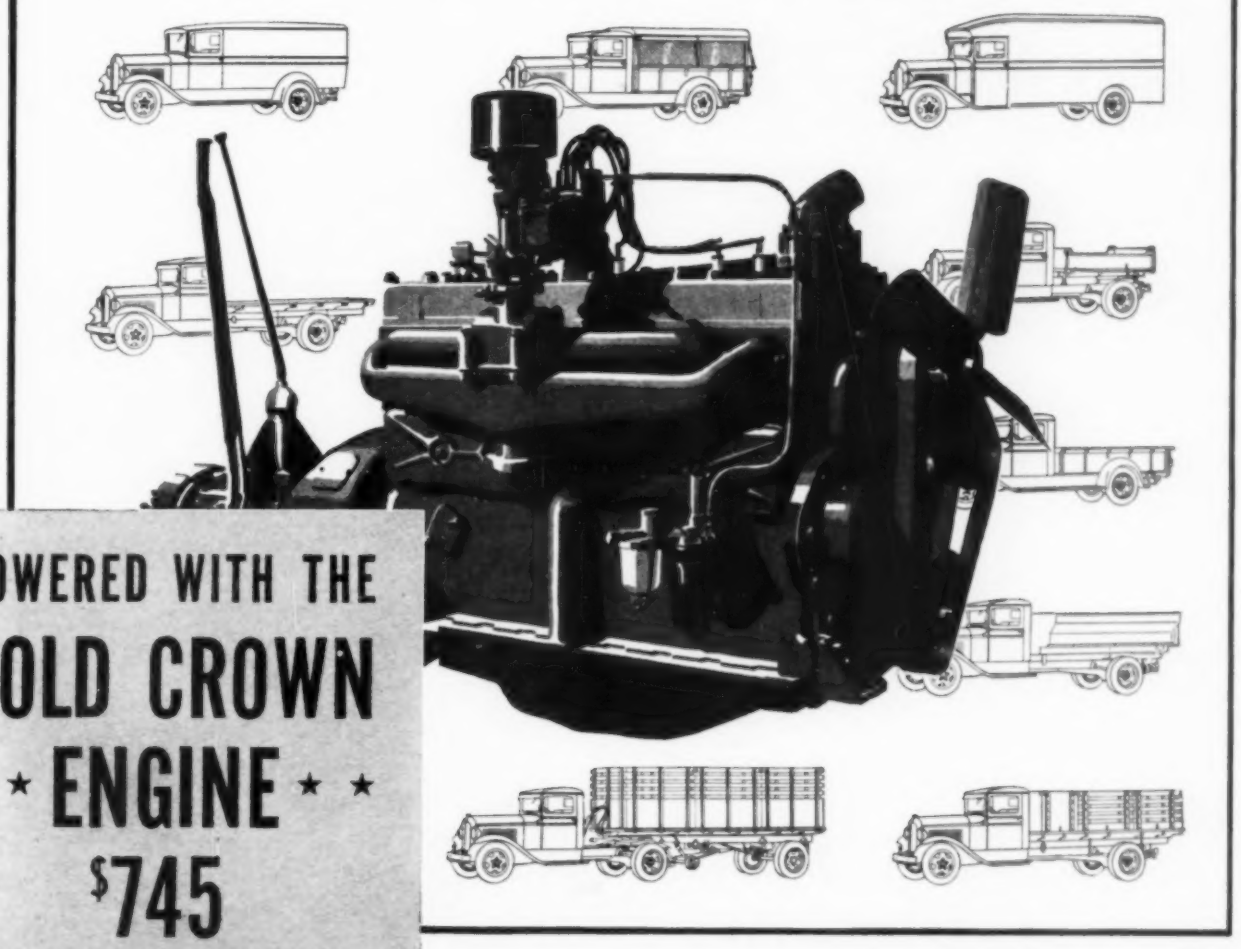
The record of Detroit's deluxe bus fleet is construed by passenger transportation authorities as an outstanding example of efficient operation and a tribute to the performance and dependability of the vehicles themselves. Although there is no data to show the average number of stops and starts per trip, it is obvious that the heavy traffic in which the buses operate necessitates almost constant use of brakes and gears. To keep on schedules, especially during peak periods when travel is heavy and traffic congested, brakes must function quickly and effectively. They must operate easily to prevent driver fatigue. Acceleration also is important. Engines, of course, must have the power and ability to get the heavy vehicle and load under way quickly.

Commenting on the remarkable record made by the "flying red" fleet, the operating manager of the D. S. R. automotive division said: "The buses speak for themselves. After more than three years' operation and an average of about 98,000 miles for each unit the fact that the buses are still going strong in daily service is pretty good evidence of their quality and dependability."

Detroit's red buses operate on what is believed to be the fastest city bus schedule in the world. They match taxicab speed on the city's most con-

(Please turn to page 12)

ANNOUNCING THE NEW 1½ TON REO SPEEDWAGON



POWERED WITH THE GOLD CROWN ★ ★ ENGINE ★ ★

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CHASSIS F. O. B. LANSING

● Since 1927 "Reo Gold Crown Engine" has stood for the ultimate in truck performance—power, speed, stamina and enduring value.

Strictly in a class of its own, it was always regarded as a power plant for heavier duty, for buyers willing to pay more for extra service and satisfaction.

Yet today Reo brings this marvelous engine to the *low price field* in a 1½ ton Speedwagon that rises far above the ordinary conception of values. ***6-cyl. Gold Crown Engine, 3⅛x5; 230 cu. in. displacement; 68 h. p. at 2800 r. p. m.; high torque at low speeds . . . Chrome Nickel block . . . Reo-built full floating rear axle . . . Reo-built 4-speed transmission . . . 140"-164" wheelbase . . . Improved appearance.***

These and countless other superior features—at no advance in price.

Possible, because Reo has had 27 years experience of quality manufacturing to prepare for its supreme stroke in value-building—and because its management, financial strength and plant facilities are intelligently co-ordinated to make the most of today's opportunity for low-cost production.

This new Speedwagon powered with the Gold Crown engine literally challenges the judgment of thousands who are losing money today by keeping worn out trucks on the road.

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REO 1½ TON SPEEDWAGON WITH 4 CYL. ENGINE—CHASSIS F.O.B. LANSING **$625**

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REO SPEEDWAGONS ··· AND HEAVY DUTY TRUCKS

Over three pits in one end of the D. S. R. garage the Dodge buses are given their regular greasing and 1,000 mile inspection Light repairs and adjustments are also made here

gested thoroughfares. They must always make better time than ordinary buses or street cars no matter what conditions may be. Under these circumstances the total mileage and the total number of passengers carried without accident are regarded as exceptional in urban bus operation.

The accumulated passenger total exceeds the combined populations of New York, Chicago, Philadelphia, Boston, Detroit, Los Angeles and Kansas City. The total mileage of the fleet is equal to 474 times the circumference of the earth. There is no crowding, as when all seats are filled, the operator displays a "loaded" sign in the windshield and the bus speeds on.

A paragraph or two regarding the maintenance procedure (this is something that is always of interest) of the Detroit Department of Street Railways' "Red Fleet" will be in order here. Mr. F. J. Gill is Transportation Division Superintendent of this fleet and is in charge of all bus operations, while Mr. G. B. Hilliker is Superintendent of Automotive Maintenance. It is through the courtesy of these gentlemen that we are able to offer this article and its accompanying pictures.

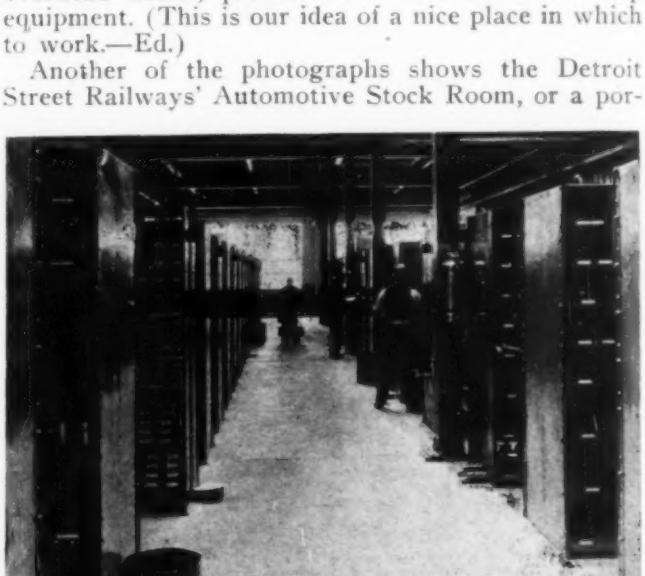
As before stated, each bus undergoes a regular inspection every 1,000, 9,000 and 15,000 miles. One of the accompanying illustrations shows one of the three inspection pits which facilitates the regular greasing and 1,000-mile inspection. Light repairs and adjustments are also made in this particular portion of the garage, which, incidentally, is the Highland Park Garage of the Detroit Street Railways.

General view of the major unit assembly room. Heavy repairs on engines, transmissions, axles and all major units are made in this department

In addition to these inspections, each driver reports the exact mechanical condition of his bus when it is turned into the garage at the end of his regular, daily run. The 1,000-mile inspections occur practically at weekly intervals, and any minor or running repairs that may be needed are promptly taken care of.

The fleet is operated and maintained on the "unit-replacement" plan, the major units being reconditioned at leisure, so that they will be ready for replacement in running vehicles at short notice. Another of the pictures shows a general view of the major unit assembly room, where heavy repairs on engines, transmissions, axles, generators, and other units are made. The reader will be particularly impressed by the extreme cleanliness of this particular department. Note the wooden-mats for the mechanics to stand on, the various engine stands, dollies, overhead hoists, presses and other items of shop equipment. (This is our idea of a nice place in which to work.—Ed.)

Another of the photographs shows the Detroit Street Railways' Automotive Stock Room, or a portion of it, at least. It certainly looks like the motto "A place for everything, and everything in its place" is rigidly adhered to in this Company's establishment. We are told that the stock of automotive replacement parts is kept particularly complete so that parts are available on short notice. Also, that a valuable stock of salvaged parts accumulates steadily and is kept with the same degree of accuracy as new parts.



The D. S. R. automotive stock room. The stock of replacement parts is always complete. In addition, a valuable stock of salvaged parts accumulates steadily

In addition to the regular inspections mentioned previously, a special chassis inspection is made every 9,000 miles and a special engine inspection is made every 15,000 miles. It is to be pointed out that these are "real" inspections and not simply "throttle-working" ones.

All Detroit is quite proud of the "Red Fleet." A visit to the motor city is not complete without a ride in one of these busses. They whisk business men to their offices and appointments at practically taxi-cab speed. Women, it is said, prefer the red busses to their own private cars for shopping tours in congested neighborhoods. They also take children to and from school in record time and passengers ride with a maximum of comfort, since the "loaded"

(*Please turn to page* 50)

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2871

Say "I saw it in FLEET OWNER"—It Helps!

By G. M. Sprowls

More Tire Mileage? Here's How:

Highway Transportation Engineer Tells How Fleet Operators Can Effect Fifteen to Fifty Per Cent Savings By Intelligent Attention to Tires

(Second Part)

HAVING purchased the vehicle, there comes the problem of operating and maintenance. Under "operating" will be considered such care and attention as the driver may give the tires, while in actual service. As an example of how important the driver is in tire conservation, I will cite the experience of a large fleet operator engaged in retail grocery delivery work.

Careful records of two vehicles of the same size and make, purchased at the same time and operating over similar routes, showed that one driver consistently secured more than twice as much tire mileage as the other.

The reason given for the wide difference was that the one driver would go at full speed to a delivery point, apply his brakes suddenly, and be almost at the rear of the house before the truck had stopped. Of course this may be a slight exaggeration, but the mileages were facts and the cause of the difference no secret.

The driver is indeed a very important factor in tire conservation. Many operators have found it to their advantage to consider tires in their bonus or merit systems. Anything which will give the driver an incentive to improve his tire mileage will yield desirable results. One operator increased his tire mileage considerably by offering a bonus of a dollar for every thousand miles a tire gave over a predetermined amount.

A system which may be called the "Pyramid Penalty System" has practically eliminated abuse for another large operator in the northwest. Penalties of different values are assigned to different offenses.

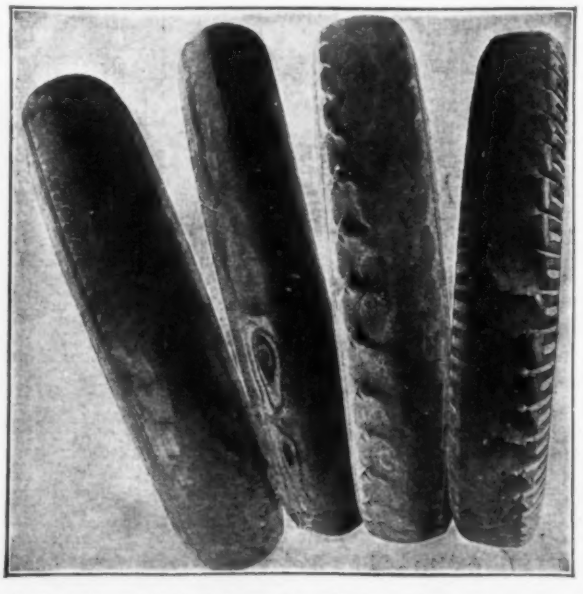
Clerical errors, for example, rate 10 miles. The first offense of running a tire flat counts 100 miles. Each succeeding recurrence doubles the value of the penalty; the second time 200 miles, third 400 miles and so on. Until the penalty miles against a driver have reached 400, they serve only as a warning. He is merely notified as soon as the penalty is listed against him.

When penalty miles reach 400, the driver is laid off without pay for the number of trips necessary to make 400 miles. Recurring repetition of a serious offense will result in the driver practically discharging himself.

The following are some of the more common tire abuses which a driver can wholly or largely eliminate:

1. *Running tires flat.*
2. *Driving over sharp objects which would cut tires.*
3. *Failing to report accidents which may put wheels out of alignment.*
4. *Uneven or too rapid acceleration or deceleration.*
5. *Running at excessively high speed for a part of a trip in order to arrive ahead of time and thus to have some leisure for himself.*
6. *Running with one of two dual tires partially off the road, throwing undue burden on the other.*
7. *Unequal distribution of load, so that one tire will carry more than its share.*

It can easily be demonstrated by actual tests, that a truck, even though traveling at high speed when a cut or puncture occurs, can be brought to a stop by normal braking (not an emergency stop) before any visible injury is done to the casing. Any driver knows when a tire is going flat on a front wheel in sufficient time to apply the brakes and stop the vehicle before injury is done to the tire.



Only a few of the thousands of tires that are prematurely being scuffed to death because of mis-alignment, under-inflation and similar neglect and abuse

It is admittedly more difficult to tell when one of the rear dual tires is going flat and even more so, if not impossible, on trailers. Mechanical and electrical devices are now in process of development which will warn the driver when the inflation pressure in any tire is reduced to a predetermined amount.

If the driver has no interest in tire conservation, he will often drive over objects which will cut the tires. Even if such objects cannot be avoided, he can usually slow down so as to reduce the liability to injury.

A driver usually knows when he hits an object hard enough to throw the front wheels out of alignment. Through fear of being cen-

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IF YOU handle truck or bus tubes it will be necessary for you to equip your shop with a Duplex Valve Converting Tool. The Tire and Rim Association has adopted a new and simplified standard of valves—straight forms for the smaller size tubes; single bend for the larger tubes . . . not more than one valve for any tube size . . . and only five sizes in all.

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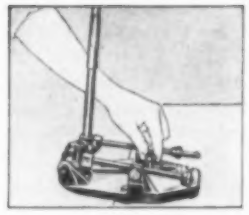
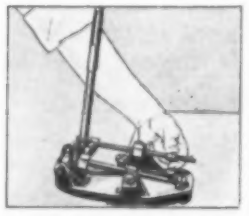
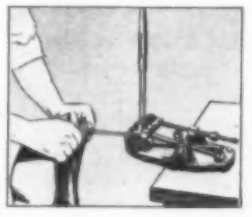
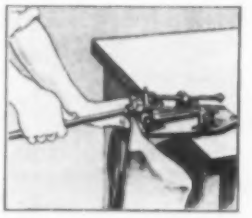
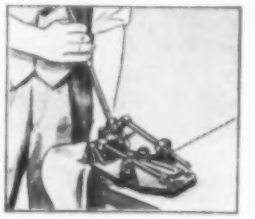
Order yours immediately—through your regular tube supplier or jobber. The tire manufacturer who supplies your tubes will gladly send you complete information on this subject. A. Schrader's Son, Inc., Brooklyn, Toronto, London.











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No. 7260

HOW TO CUT YOUR TIRE COSTS (*Continued*)

sured or for some other reason, he sometimes fails to report such incidents with the result that the tires may suffer from excessive tread wear.

The most important cause of excessive tread wear is slippage. Laboratory tests with a tire perfectly aligned and running against a large pulley covered with coarse sandpaper have shown less tread wear after 3,000 miles without slippage than a few hundred feet with slippage. Of course, it is impossible to entirely eliminate slippage. A careful driver will not normally start or stop suddenly but will operate his vehicle with moderate and uniform acceleration and deceleration.

Driving at high speed greatly reduces tire mileage. Speed affects tire life in two ways, first by increasing slippage and secondly by raising the temperature of the tire.

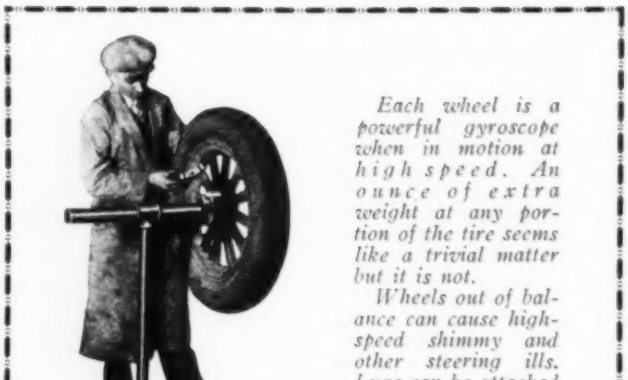
Usually it is possible to load a truck so that the various tires will take their proper share of the load. The total load may be within the total carrying capacity of all the tires, but some of the tires may be grossly overloaded by uneven distribution. The manner of loading should therefore be carefully watched.

In the matter of tire maintenance, probably the most essential requirement is uniform inflation pressure as called for by the size of tires and load carried. The standards of the industry are those adopted by the Tire and Rim Association. Facilities should be provided for quick and easy inflation. Insufficient volume or pressure in air storage tanks is to be avoided.

If air compressors pump oil, a baffle or strainer tank should be provided to prevent the oil from being carried into the tubes. The reason for this is that oil causes deterioration of rubber. Accurate means of checking inflation pressures should be provided. After long and hard service, gauges are apt to give incorrect readings and should be checked at regular intervals against a master or standard gauge.

The driver is a very important factor in tire conservation. Bonus systems should give the driver an incentive to improve his tire mileage

Maintenance of regular inspection of tires is highly desirable. The removal of foreign material from cuts will often prevent expensive repairs or early failures. A small hand pressure gun is now on the market with which small tread cuts can be filled with a specially prepared rubber compound. This treatment will prevent moisture, sand and grit from getting down to the carcass and causing ply separation which may later result in tire failure. This type of repair should be limited to small cuts or nail holes. Large cuts should be taken care of by vulcanizing.



Each wheel is a powerful gyroscope when in motion at high speed. An ounce of extra weight at any portion of the tire seems like a trivial matter but it is not.

Wheels out of balance can cause high-speed shimmy and other steering ills. Lugs can be attached to perfectly balance any wheel as shown here.

Much has been written regarding front wheel steering geometry and alignment. To discuss this subject fully would require more space than is at our disposal. Suffice it to say that a combination of toe-in, camber, and caster, which will give easy steering and minimum tire slippage is desirable. Excessive toe-in is the most serious fault as far as tread wear is concerned. Confining toe-in to a maximum 3/16" on High Pressure tires and 1/8" on Balloons will prevent excessive wear from this cause. A satisfactory toe-in gauge is necessary and should be easy to operate and so constructed as to read the toe-in at approximately the height of the center of the hub.

Grabbing or unequalized brakes will cause excessive wear. Protruding bolts, bent fenders or other obstructions rubbing against any of the tires should be removed. Sometimes such abrasion occurs with heavy loads or with unusual sway of the body.

Changing tires from one position to another to compensate for various types of wear or other conditions is very desirable. If front tires show marked camber wear on one side and the camber trouble cannot be immediately corrected, considerable additional mileage may be secured by reversing the tires on the same wheels. Under certain types of service, a fairly well worn tire used on the inside wheel position of a dual mounting will result in equalizing the load carried by both

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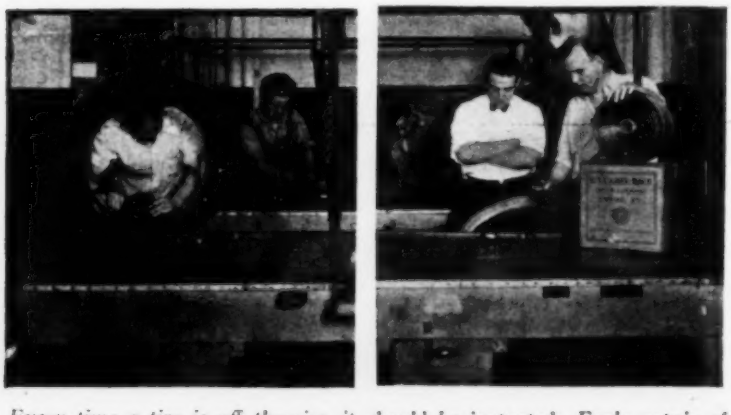


Every time a tire is off the rim, it should be inspected. Early repair of small breaks will considerably lengthen tire life

HOW Carnation CUT OIL BILLS

The answer—a Skinner Reclaimer is on the job in their garage. And that's been the answer for hundreds of other successful fleet owners who are making money in spite of hard times.

Let Paul C. Bryan, Manager of the Fresh Milk Division of the Carnation Company, Seattle, Washington tell you how a Skinner is doing this oil-and-money saving job for them by turning old crank case drainings into good-as-new oil.

"We purchased a Skinner Oil Reclaimer in January 1931, and during the last five months of 1931, August to December inclusive, we reclaimed 1,126 gallons of oil at an average cost of approximately 12c per gallon, which included labor, electricity, filter pads and interest on our investment.

This reclaimed oil was produced from 1,405 gallons of crank case drainage oil, showing a recovery of 80% reclaimed oil from used oil. The machine requires very little attention while running oil and the results have been entirely satisfactory."

Frankly, there's no legitimate excuse for your oil bills being a burden when you can easily have a Skinner Reclaimer on the job in your own garage—cutting your oil expense from 25% to 50%. Quit throwing hard earned dollars away by trying to do business without a Skinner. Don't put it off any longer. Mail the coupon for facts about the size that fits your particular needs. A Skinner soon pays for itself and will make money for you, too.

SKINNER OIL RECLAIMERS

MADE BY SKINNER MOTORS, INC., PIONEERS IN OIL RECLAMATION,
2229 DALZELLE, DETROIT, MICH.

Clip and Mail Today WITH YOUR BUSINESS LETTERHEAD

SKINNER MOTORS, INC., Pioneers in Oil Reclamation,
2229 Dalzelle at 14th St., Detroit, Mich.

Please send us, without obligation, complete information about Skinner Oil Reclaimers. Also tell us definitely with facts and dollar-and-cents figures what a Skinner Reclaimer will save us in cash and oil.

We purchase approx. ..... gallons of oil per month.
We drain approx. ..... gallons of oil per month.
We pay ..... per gallon of oil.
Our electric current rate is ..... c per kilowatt hour.

Signed ..... Position ..... 6—32

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

What Skinner Reclaimers are saving in hundreds of dollars and gallons of oil for these and dozens of other fleet owners is typical of what a Skinner in your own garage can do for you.

from Maryland

"SKINNER GREATLY REDUCES OUR OPERATING COSTS"—writes A. F. MacDonald, Gen. Supt., The Blue Ridge Trans. Co., Hagerstown—who were "skeptical at first as to the use of reclaimed oil in our high speed bus operation."

from Porto Rica

"SAVINGS $175.00 PER MONTH—NOT TO MENTION LONGER LIFE OF ENGINES due to frequent drainings"—writes Rafail Averlay, Asst. Gen. Mgr. White Star Bus Line, Inc., Hato-Rey.

from Ohio

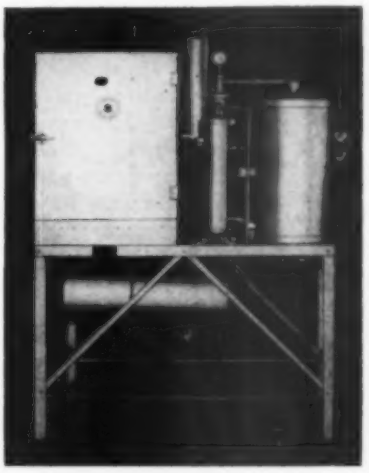
"OUR SAVING BETTER THAN 75%"—writes O. B. Reemelin, Mgr. Elec. Div., The Dayton Power & Light Co., Dayton.

from Arkansas

"MORE FREQUENT DRAININGS LOWER MOTOR REPAIR COST"—writes Robert A. Titus, Shop Foreman, The Coca-Cola Bottling Co., Little Rock—who operate 56 motor units.

★ ★

HERE'S THE MACHINE THAT'S reducing oil bills for hundreds of prominent owners of all types of fleets—25% to 50%. Skinner Reclaimers are priced as low as $290. Get those facts and figures about this dollar-and-oil saving equipment.



It takes 1250 gallons of milk to fill the glass-lined thermos tank on this truck, typical of the Carnation fleet. And 1250 gallons is only a little short of the amount of oil that a Skinner reclaimed for this fleet owner in five months—at 12c a gallon. What a saving! Skinner's quickly pay for themselves.

By Stanleigh Megargee
Supervisor of Automotive Equipment, Pie Bakeries, Inc., Newark, N. J.

"Mother Ship" Feeds Pie Fleet

New Transportation Unit Relays Nine Tons of Pies and Does It Six Nights a Week — Streamlining of Semi-Trailer Body Cuts Gasoline Consumption

A NEW transportation unit was recently put in service by the Pie Bakeries, Inc., who produce the famous Mrs. Wagner's Pies and whose headquarters are in Newark, N. J. Their bakeries are located in Newark, Brooklyn, Chicago and Detroit, with many distributing plants in towns and cities within 100 miles of each bakery.

This particular unit is used to relay an average of nine tons of pies from the Newark plant to the distributing plant in Philadelphia six nights a week.

It is the latest development in a high speed, heavy-duty tractor, produced by the White Company, and is capable of averaging 45 miles an hour with a ten-ton load. It is equipped with four-wheel hydraulic brakes whose efficiency is further increased by the use of B. K. booster brakes. The brake equipment on the trailer is of the same high standard.

The streamlined body, built by Peter Wendel Sons, also of Newark, was designed for this particular purpose. It is 20 feet long, 7 feet wide and 6 feet high inside. The sides and top are of aluminum, polished and then given a coating of a special lacquer. The floor, sills, uprights and roof ribs are of steel and wood.

The body is 40 per cent lighter than the conventional body. It is equipped with ventilators, front and rear, thermostatically controlled. As can be seen, the front and rear ends converge to a point which eliminates 80 per cent of wind resistance without losing any cargo space. By installing a door in the right side of the front end, a compartment is afforded in which two mounted spare tires and the driver's tools are kept. The rear end is used for regular cargo space.

A novel arrangement of a gate was designed to keep the cargo from shifting when the body is not completely filled, by having a gate hung from two strips of angle iron running from the front to the rear of the body on both sides, and 18 inches from the roof and the same distance from the floor. This angle iron has ½" holes every 2 inches so that the gates are moved up to the end of the load and locked, thereby holding the load in the exact position in which it was placed.

The rear end was constructed so that that part of the body under the pointed end is part of the floor and that part of the roof over the pointed end forms parts of the doors. When the doors are opened, half of the roof opens away with each door and the corners of the floor drop down flush with the floor. When the doors are opened and folded back against the sides of the body, the roof folds down so as not to take up excessive room.

This design was necessary, after streamlining was found to be an economical necessity, in order to make all of the body space carry payload. Streamlining is a big factor which, by actual test, gives us the low gas consumption of 6.2 miles to a gallon of gasoline.

An added feature of illumination is used, i.e., special lights designed to penetrate fog are installed on the front end of the chassis frame. An electric signal is on the rear end of the trailer, controlled by the driver, to indicate right and left turns, and the front ends and sides of the body are illuminated so that Mrs. Wagner's picture (life size) is strikingly displayed to the public as those thousands of pies are being transported over the highway six nights a week, fresh from the ovens, and are available in the Philadelphia stores and restaurants when they open for business in the morning.

It is interesting to mention that this is the second transportation unit of this kind that we have placed into service within a recent period of sixty days.

AN interesting thing about this semi-trailer unit is the body. Note the points at front and back. This was to provide streamlining and in order to make all of the body space carry payload. When the rear doors are opened, half of the roof opens away with each door and the corners drop down flush. The pointed section of the floor is supplemented by tailboards.

Meeting the PACKER'S requirements with PLYMETL inside and out

"Built extra strong, ideal for packers," reads the builder's description of these PLYMETL bodies. Thirty-five of this type were recently delivered to the Independent Packing Company, St. Louis, Missouri.

Packing truck bodies are built to meet rigorous requirements. They must be light to allow maximum capacity, yet strong enough to resist the terrific pounding of the load. PLYMETL paneling provides ample strength at no increase in weight, and in addition it keeps the insulation at highest efficiency, despite frequent washings.

PLYWOOD HASKELITE PLYMETL

Whatever the type of body or service, PLYMETL meets requirements. That is why some of the largest fleets in the country are paneled with PLYMETL. Look into the merits of PLYMETL before you draw up specifications for new equipment.

HASKELITE MANUFACTURING CORPORATION

120 SO. LA SALLE STREET CHICAGO, ILL.

New York Distributor, Esdorn Lumber Corporation, Leggett Ave. & Barry St., New York City
In Canada—Railway & Power Engineering Corp. Ltd.

60-Vehicle Bus Fleet for Chicago Fair

Courtesy of
C. E. Wickman
President, The Greyhound Corporation

Truck and Semi-Trailer Units of Modern Design Will Provide Major Intra-Fair Transportation at 1933 "Century of Progress" Exhibition

A FLEET of specially designed truck and semi-trailer type motor buses will provide the major intra-fair transportation system carrying the millions of visitors around the grounds during Chicago's 1933 World's Fair.

A contract providing for this $500,000 bus transportation system has been signed by officials of the Greyhound Corporation and A Century of Progress Exposition. The General Motors Truck Company will furnish the transportation units.

The bodies will be built along novel, modern lines and will be painted in gay colors to correspond with the general color scheme of the Exposition buildings.

Each transportation unit will have a longitudinal seating arrangement with a capacity of ninety passengers. The buses will be open, with a roof overhead and curtains for use in inclement weather. The fleet will comprise sixty units during the Fair, and will be able to handle from 15,000 to 20,000 passengers per hour, operating about fourteen hours a day. The buses will be forty-five feet long.

Two of the transportation units will be placed in operation on the Exposition grounds this summer in order to give actual tests to the seating arrangements and other new features, C. E. Wickman, president of the Greyhound Corporation, announced.

Because of the extreme length of the Fair Grounds, the longest in exposition history, the fleet will be operated in two groups during the Fair. One will be on a high speed through arterial route and the other will be on slow moving or sightseeing routes.

The Fair grounds stretch from Twelfth Place to Thirty-ninth street along the shores of Lake Michigan and includes Northerly Island, an 82-acre tract separated from the mainland by a broad lagoon.

The high speed line will be operated from the north entrance of the grounds to the Travel and Transport building at Thirty-fifth street. In the near future work will start on a $50,000 wheelway twenty-two feet wide and segregated from pedestrian traffic for this route. The wheelway is to be built of an asphalt composition. Between the north and south terminals there will be seven stations where passengers may get off or board express buses after dropping their dimes in a slot machine and passing through turnstiles. The average speed will be fifteen miles an hour.

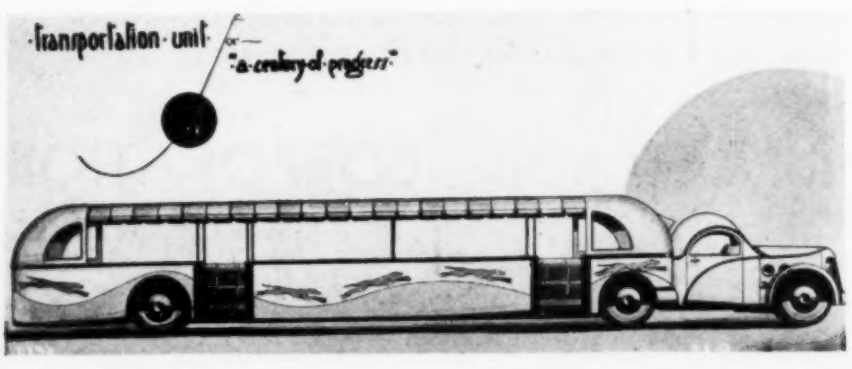
The principal slow route will start near the north entrance, circle Northerly Island and return to the mainland near the Twenty-third street entrance. The slow moving units will operate on the same roadway as that used by pedestrians, at an average speed of four to eight miles an hour. These slow moving units will also be used on other routes on the grounds where there is a demand for transportation or for sight-seeing vehicles.

The fare for both the express and slow services, Mr. Wickman stated, will be ten cents.

"Two shifts of a driver and conductor each will be employed on each transportation unit," said Mr. Wickman. "Cashiers and other attendants will bring the total number of employees to above 300."

The truck and semi-trailer system of transportation was determined upon because of its extreme flexibility and its ability to meet the rapidly fluctuating conditions of exposition traffic. Thus the routings and number of units may be changed on short notice and the system can be operated to meet the traffic demands for large special events which will be held on different parts of the grounds.

In addition to this major transportation system at Chicago's 1933 World's Fair, there will be electrically operated chairs and push chairs operated by man power, while on the lagoons and along the lake there will be gondolas, speed boat and other water craft.



"Time Marches On"

NOT a bus operator's dream of the future motorcoach, dear reader, but an artist's drawing of the new transportation units that will carry passengers around the Chicago 1933 World Fair grounds at a dime a head.

With truck and semi-trailer units being utilized throughout, maintenance problems should not present very many difficulties. We should not want the washer's job, however. There'll be 60 of these units in service, we understand.

Powered for tough semi-trailer work

STUDEBAKER 2-ton trucks are the best in the world for tractor service—that is what experienced operators will tell you.

Studebaker 2-ton trucks move their tonnage at a lower net cost per ton mile than any other truck built today—a strong statement but we mean every word of it.

Studebaker 2-ton trucks are priced as low as $895 at the factory. 75 h. p. 6 cylinder engines, Timken 54,200 full-floating rear axles, 7-inch frames amply braced and every other unit equally strong. Real 2-ton trucks—from bumper to tail light.

1½-Ton Chassis . . $670 to $745
2-Ton Chassis . . . $895 to $945
3-Ton Chassis . . $1350 to $1425

B. K. Booster Brake and Auxiliary transmission standard on 3-ton chassis

Prices at factory. Bumpers and spare tire extra. Cabs and all standard bodies available on all chassis

Say "I saw it in FLEET OWNER"—It Helps!

How to Service New Bendix Brakes

By W. A. Royce

(1932 Types)

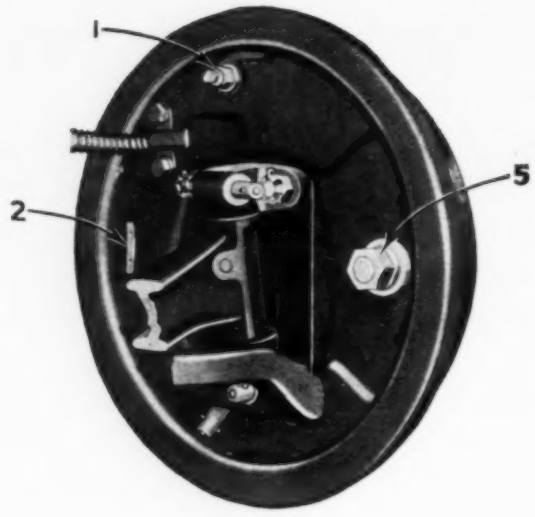


FIG. 1

TWO new types of single-anchor, two-shoe Bendix brakes, operating on the duo servo principle, will be found on a large percentage of the 1932 automobiles. Developed by the Bendix Brake Company, subsidiary of Bendix Aviation Corporation, the new brakes are claimed to be simpler in construction, easier to service and more positive in action than previous two-shoe Bendix brakes. One type is known as the sliding adjustment type anchor (Fig. 4) and the other as the eccentric type anchor. (Fig. 6.) (See following page).

Because of the general adoption of these brakes, service shop mechanics will wish to familiarize themselves with their major points of construction and adjustment.

There are only two adjustment points to compensate for brake lining wear. One is the eccentric adjustment (1 in Fig. 1) which centers the brake shoes in the brake drum. The other is the adjusting screw (2 in Fig. 3) which regulates clearance between brake lining surface and brake drum to compensate for lining wear. Adjustment for lining wear must be made only at the brake shoes—not in the brake control system.

For general adjustment of the sliding type anchor, Bendix engineers recommend the following procedure:

1. Jack up all four wheels and make sure brake pedal and cross shaft are returning freely to a fully released position. If necessary, make adjustments either at the pedal adjusting screw stop or pedal linkage, depending on construction of the control system. The parking brake lever and its linkage also should be inspected to make sure there is a slight amount of backlash when the hand end of the lever is in its fully released position.

2. Inspect brake cables. If loose or unequal, all four cables should be adjusted. Using an adjusting tool or screwdriver, expand brake shoes at the adjusting screw (Fig. 2) until each wheel can barely be turned by hand. If necessary, readjust all four cable lengths. To do this, first back off each clevis lock nut and remove clevis pins. Then adjust clevis until pin can be easily entered through clevis and cross shaft lever holes, meanwhile pulling on the cable to remove backlash and slack at the shoe actuating lever (12 in Fig. 3). Install clevis pin, lock with cotter key and tighten clevis lock nuts.

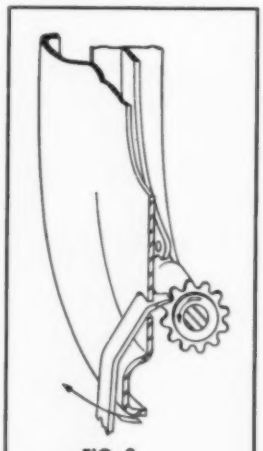


FIG. 2

3. Remove inspection and adjusting hole covers (2 in Fig. 1) from brake drums. Loosen lock nut on eccentric adjustment (1 in Fig. 1) and insert .014-inch feeler gage between brake drum and lining, about 1½ inches from the adjusting screw end of the top shoe lining (Fig. 3). Turn the eccentric adjustment in the direction wheel revolves when the car is moving forward until the .014 feeler gage is snug. Then tighten the lock nut.

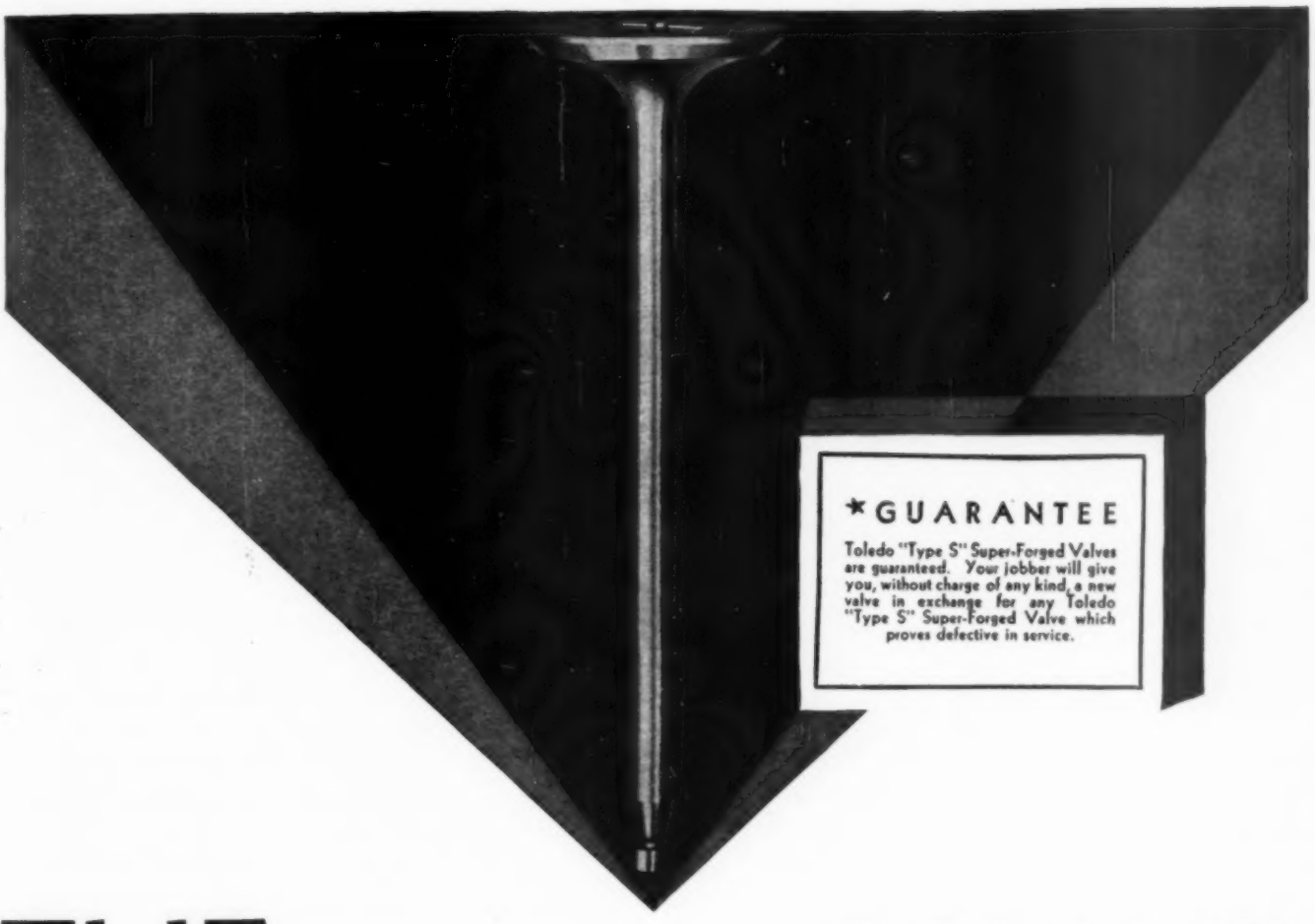
4. Next, try an .008-inch feeler gage at a point 1½ inches from the anchor pin end of the top shoe lining (Fig. 3). Clearance at this point should not vary on any of the four wheels more than .003 of an inch. If it does, the anchor pin must be relocated. This is accomplished with the sliding adjustment type anchor by loosening the anchor pin nut (5 in Fig. 1) one turn and tapping anchor pin slightly with a soft hammer. (The anchor pin will shift in its elongated hole when tapped.)

Meanwhile, if necessary, readjust the eccentric to give clearance of .014 inch at the adjusting screw end of the top shoe lining. It is important to then tighten the anchor pin nut as much as possible with a 16-inch wrench. However, the anchor pin should **not** be adjusted unless absolutely necessary. It is required only when other adjustments fail to give results, or when anchor pin is loose, or when fitting relined shoes.

After proper clearance is obtained, the next step is to expand brake shoes one notch at a time with adjusting tool (Fig. 2) until lining comes in contact with brake drum. Then release the adjusting screw at each of the four wheels from eight to twelve notches, using care that the same number of notches are released on each wheel.

5. Depress the pedal with pedal jack until the wheel having the least brake drag can barely be

(*Continued on page 24*)


★GUARANTEE
Toledo "Type S" Super-Forged Valves are guaranteed. Your jobber will give you, without charge of any kind, a new valve in exchange for any Toledo "Type S" Super-Forged Valve which proves defective in service.

THE GUARANTEED VALVE

TOLEDO VALVES are standard equipment on the following:

BUDA MOTORS
CONTINENTAL MOTORS
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DURANT
MATHIS
ADVANCE-RUMELY TRACTORS
ALLIS-CHALMERS TRACTORS
MASSEY-HARRIS TRACTORS
J. I. CASE TRACTORS
PALMER MARINE

AT NO EXTRA COST . .

Summer traffic is the test of valve quality; then, if ever, must a valve have guts. But you don't need to pay a premium to get a valve which stands this test. Install Toledo Valves. They cost no more but they give to a motor real performance which is backed by the guarantee of a reputable valve manufacturer. The sturdy month-in and month-out service of Toledo Valves keeps your fleet on the road earning revenue, not in the shop costing you money . . . Specify Toledo Valves and save money.

The Toledo Steel Products Company, Toledo, Ohio, U. S. A. • New York, 17 W. 60th Street • Chicago, 1225 South Wabash Ave. • Atlanta, 279 Ivy Street, N. E. • Dallas, 2805 Commerce Street • Kansas City, 14th and Oak Streets Los Angeles, 1341 South Hope Street • San Francisco, 528 Larkin Street • Warehouse: Toronto, 2-10 Breadalbane Street.

TOLEDO

A "HOW-TO-DO-IT" ARTICLE (*Continued*)

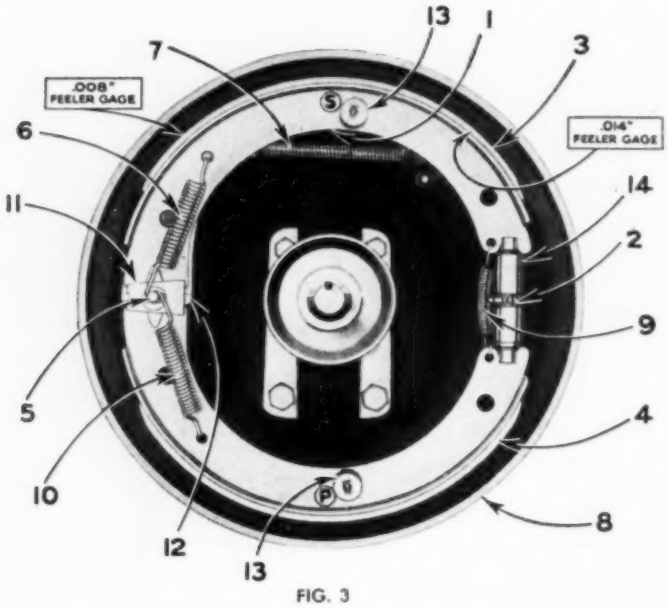


FIG. 3

turned by hand. Then back off the adjusting screw on the tight brakes until brake drag is alike on all four wheels. It must be remembered to always *loosen* adjusting screw on *tight* brakes, rather than tighten screw on loose brakes. This prevents sending the car into service with one brake too tight.

6. Remove pedal jack, check all wheels for freeness, lower car and make final check on brake testing machine or road. Last, replace drum inspection hole and adjusting screw covers

Adjustments for the eccentric type anchor brakes are the same as the foregoing except in the manner of adjusting the anchor pin. In this type brake the outer end of the anchor pin (Fig. 6) is shown with an indication that the higher side of the screwdriver slot corresponds with the high side of the eccentric section of the pin. By turning the anchor pin in either direction the lining will be brought in contact with the brake drum.

First loosen anchor pin nut with a wrench and then turn anchor pin with a screwdriver in the same direction the wheel revolves when the car is going forward, until there is a decided brake drag. Release in opposite direction enough to allow inserting an .008-inch feeler gage about 1½ inches from the anchor pin end of top shoe lining and then try a .014 gage the same distance from adjusting screw end.

By turning the anchor pin forward and reversing, and if necessary readjusting the eccentric, the feeler gages will become snug, giving specified clearances of .008 and .014 inch. After clearances are properly established on each wheel, hold anchor pin with screw driver and tighten pin nut as much as possible with 16-inch wrench.

On some cars there is incorporated a brake shoe stop at the bottom of all the four brake assemblies. (Fig. 5). If such stop is incorporated, before beginning a brake adjustment loosen the lock nut and shift the stop upward in its elongated hole in the backing plate and tighten the lock nut until after all other brake adjustments are completed. As a last adjustment, loosen lock nut and allow stop to move down in contact with the band of the brake shoe and tighten nut.

Construction of the new two-shoe single anchor duo servo brake is plainly shown in Fig. 3. This is a wheel side view of a left front brake with drum removed. In re-assembling brake shoes (3 & 4 in Fig. 3) into their proper location on the backing plate (8) *where two different types of brake lining are used in the same brake,* it is necessary to assemble linings and their respective shoes into a definite location.

Brake shoes shown in Fig. 3 are marked by the letters "S" and "P", abbreviating the words "secondary" and "primary". Irrespective of the position in which the brake assembly is mounted to the axle, the primary shoe is always the one that comes in contact with the brake drum first during a forward braking application to transfer forward braking to the secondary shoe.

From a Bendix brake lining specification sheet can be found what type of brake lining is specified on any model car for the primary and secondary shoes. If the *same* brake lining is used on both shoes the foregoing inspection is unnecessary.

Indicated at 6 & 10 in Fig. 3 are the brake-shoe-to-anchor-pin return springs. On all cable controlled braking systems of the single anchor pin type, the heavier spring (known as the "top shoe return spring") should always be connected with the top shoe. This is necessary to provide satisfactory braking action in a forward as well as reverse direction.

In re-assembling adjusting screw (2) it is necessary that pivot nut (14) which does not have a groove around the outside be assembled to the right of the adjusting screw notched wheel and must engage with the shoe *to the mechanic's right as he faces the brake from the adjusting screw side.*

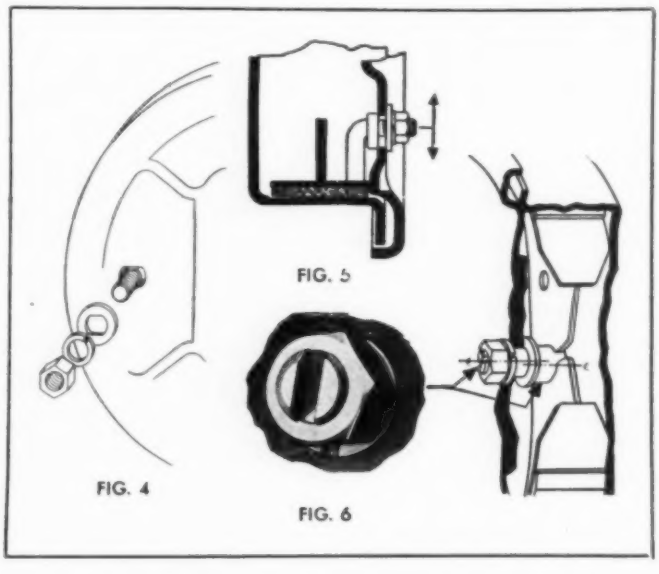


FIG. 5

FIG. 4

FIG. 6

To remove hold-down springs (13 in Fig. 3), press the outer cupped washer in toward the brake shoe and revolve 90 degrees.

An explanation of the various illustrations that accompany this article follows. Use it when referring to the drawings and photographs:

Fig. 1—Back of left front brake showing: (1) eccentric adjustment; (2) adjusting hole cover; (5) anchor pin nut.

Fig. 2—Method of operating adjusting screw.

Fig. 3—Wheel side of left front brake with drum removed showing: (1) eccentric adjustment; (2) ad-

(*Please turn to page 50*)

CUT *your operating* COSTS

Chassis and Wheel Alignment —an important part of Fleet Maintenance . . . . . .

Straighten frames and axles without removal of body, fenders or axles. Jobs that required days now done in a few hours.

EVERY truck owner knows the value of under-the-hood maintenance. The engine must be kept in good running order, or the truck can't earn money. Yet other parts of a truck are JUST AS IMPORTANT to insure, efficient performance and freedom from breakdown — especially the frame, axles and wheels.

With the Bear System of Wheel Aligning, Axle and Frame Straightening all chassis maintenance is handled quickly and accurately. The Bear Heavy Duty Axle Press and Frame Straightener is made to accommodate the largest trucks and buses.

Fleet owners are finding that the proper maintenance of their equipment regarding perfect alignment of wheels, axles and frame is a sound investment effecting substantial savings in tires, time and repair bills. Another big advantage is increased safety.

Scientific gauges, powerful hydraulic presses and manufacturers' original specifications enable your shop mechanics to do the job without guess work and in a fraction the time of any other method.

If you have a fleet of any size, it will pay you to investigate the Bear System.

BEAR MANUFACTURING CO.
ROCK ISLAND, ILLINOIS

BEAR
WHEEL ALIGNING • • AXLE & FRAME STRAIGHTENING SYSTEM

QUESTION *of the* MONTH

"By far, one of the most valuable departments to be found in any automotive publication. Every fleet man should be delighted to cooperate."—A Reader

Here Are a Few Representative Answers to Question No. 20:

"Checked at General Inspection Time"

"AT each general inspection time our vehicles are checked and tested for proper wheel and axle alignment. We use the Duby-Manley tilt gauge and also a wheel stick. Other factors of front wheel alignment are checked by visual observation and gauges.

"If possible, bent front axles are straightened in the vehicles; if necessary, they are removed. We straighten them cold, and *not* with heat. We have the following equipment: wheel aligning gauge, caster gauge and toe-in gauge.

"It *is* necessary to check and correct caster before attempting to check the toe-in of the front wheels and this is done in our shop."—*Fred C. Hall, Transportation Supervisor, Lincoln Telephone and Tel. Co., Lincoln, Nebr., operating a fleet of 40 trucks, 135 passenger cars and 80 trailers.*

"When Overhauled, or Every 6 Months"

"WE use the Bear System of Wheel & Axle Alignment and this work is done on our vehicles when they are overhauled, or on an average of every six months. This covers toe-in, camber, caster, bent front axles, tracking and bent frames.

"We straighten bent front axles in the car where possible, but do not use any heat for this work. We have the wheel gauge, axle gauge and spindle gauge. We check caster first, before attempting to check for toe-in, which we understand is the correct procedure."—*A. M. Amidon, Foreman, Onondaga Milk Producers Co., Syracuse, N. Y., operating a fleet of 38 trucks and 12 passenger cars.*

Uses Both "Bear" and "Ideal"

"AS a part of our regular inspection, once each week, we check the vehicles in our fleet for proper wheel and axle alignment in the front end, using both the Bear and Ideal wheel and axle machinery and instruments.

"Toe-in is taken care of by adjusting the tie-rods. Caster by adjusting the axle-wedges and air springs. Camber by looking after the spindles and bushings.

"Bent front axles are straightened out of the vehicles, *without* the use of heat. Our front axle aligning equipment includes wheel aligning gauge, caster or axle gauge, toe-in gauge and others.

"We find it necessary to first check and correct caster before attempting to check for toe-in. This procedure is followed in our shop."—*R. W. Kelly, Superintendent, Iowa Southern Utilities Co., Ottumwa, Iowa, operating a fleet of 7 trucks, 23 busses, 3 passenger cars and 2 trailers.*

"Six Months and Oftener"

"REGULARLY, we check wheel and axle alignment every six months and more often if necessary. We use the Bear System, and are equipped with toe-in gauge, also wheel aligning gauge. When toe-in is found incorrect, it is possible that caster and camber are also wrong, so it is best to make a complete check in all cases.

"Bent front axles are straightened, in a few cases in the vehicle; in most cases they are removed and straightened *cold*."—*R. B. Mason, Supt., Kansas City Gas Co., Kansas City, Mo., operating a fleet of 65 trucks, 30 passenger cars and 3 trailers.*

"We Do It Every Month"

"OUR preventive maintenance work includes front wheel and axle alignment and we do this work every month on the vehicles in our fleet, using aligning gauges. Some of the more intricate checking work is at present being sent out to specialists in this business, including the straightening of bent front axles. We are at present equipped with a wheel aligning gauge, or toe-in gauge.

"Usually, if a vehicle has been injured it is necessary to check and correct caster before attempting to do anything else to the front end."—*Jack Lehr, Supt., Arctic Dairy, Kansas City, Mo., operating a fleet of 40 trucks and 10 passenger cars.*

"We Use a Wee Jee Board"

"SINCE we do not have much equipment for checking and correcting front wheel and axle alignment, we send most of this work out to a service station in that particular line of business.

"However, we check for toe-in every two weeks, using the 'Three Way System' and a 'Wee Jee Board.' Front axles are straightened in the car, where possible, without using heat. We have no other equipment of this type."—*J. T. Latta, Foreman City Garage, City of Durham, N. C., operating a fleet of 30 trucks, 20 passenger cars, 3 trailers and 5 others.*

"Good Wheel Alignment Pays"

"WHEEL and Axle Alignment preventive maintenance is practiced in our fleet, the vehicles being checked for same every 2,000 miles. We use a combination of equipment, including Bear, Duby, Weaver and some of our own home-made devices for this work.

"Bent front axles are straightened in the cars, if permissible; if necessary they are removed and straightened on a press. Cold straightening is done almost exclusive-

(*Please turn to page 31*)

KROGER BUYS 95 MORE

HIGHWAY TRAILERS *and* BODIES

KROGER *decides that* H
GREATEST TRAILER VALU
because the TRAILER SENSA
of 1932 *offers...*

1. New, unique in body design
2. Sturdy, light, flexible
3. Drop frame, low loading height, curb doors
4. Highway Trailer chassis design
5. Highway positive fifth wheel
6. Striking paint jobs

Licensed under Martin Rocking Fifth Wheel and Trailer Co. Patents. *Martin Patent Numbers*
1,195,832, 1,183,313, 1,169,717, 1,259,120, 1,412,025

The MILLION DOLLAR SIGN BOARD

Highway Trailers take your name and Product Everywhere

Day After Day Your Trailers Are On Parade!

With a definite engineering and transportation service, the Highway Trailer Company has achieved the ultimate in trailer transportation for the Kroger Grocery & Baking Company—cheaper transportation combined with publicity value embodying also the superior qualities of manufacturing and exceptional design of Highway Trailers result in the trailer sensation of 1932.

Geared

As HIGHWAY does

In line with the change in consumer demands and the necessity that all food stuffs be fresh and vitalized, the Kroger Company consider the immediate delivery of their products to consumers of sufficient value to warrant the extensive development of their transportation services. Only Highway with its engineering and plant facilities and custom body shop is in a position to offer this service.

HIGHWAY TRAILER CO.

t HIGHWAY *is the*
ALUE *on the market . . .*
NSATION

Geared to the road

/AY does for KROGER . . .

nge in consumer de-
y that all food stuffs
he Kroger Company
e delivery of their
of sufficient value to
development of their
Only Highway with
nt facilities and cus-
position to offer this

Let Highway engineers analyze your hauling problems and recommend definite practical economies combined with the new use and new ideas in trailer engineering which forecast the coming transportation services which many large operators will have in the next few years.

We offer trailer transportation engineering with definite practical results, forecasting and going beyond the present horizon.

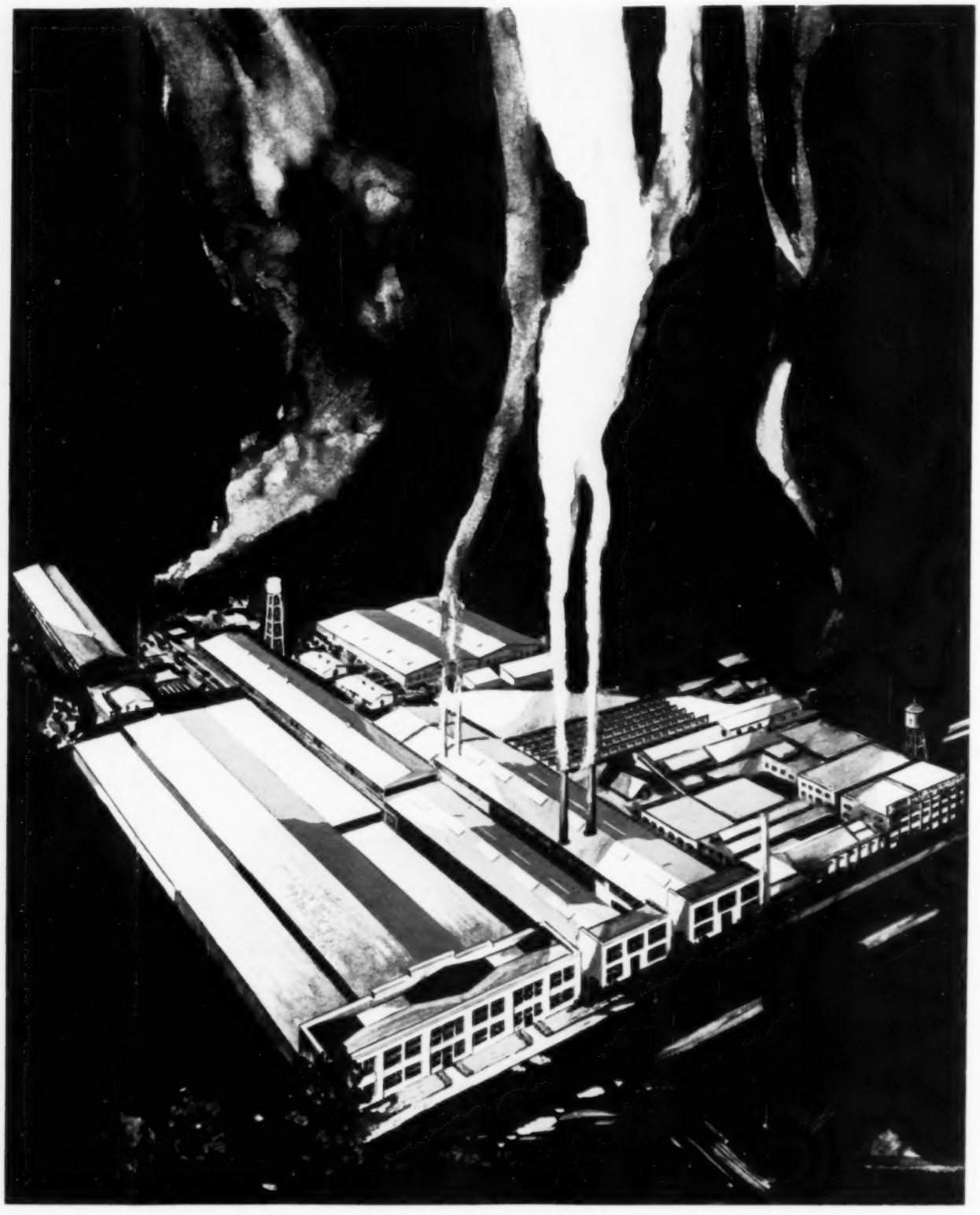
More HIGHWAY TRAILERS in use than any other make.

HIGHWAY TRAILERS

CO.

The World's largest Custom Body *and* Trailer Plant

. . EDGERTON – WISCONSIN . .



1,000,000 square feet devoted exclusively to trailer manufacturing

The HIGHWAY TRAILER Co.

EDGERTON, WIS. PLANT 1

The Worlds Largest Trailer Plant

STOUGHTON, WIS. PLANT 2

Advanced Transportation

QUESTION - *of* - *the* - MONTH CLUB (*Continued*)

ly, it being very seldom that we use heat for straightening.

"Our shop is equipped with wheel aligning gauge, caster gauge, toe-in gauge, tracking gauge and camber gauge."—*Oklahoma Gas & Electric Co., Oklahoma City, Okla., H. R. Grigsby, Supt. of Transportation, operating a fleet of 86 trucks, 314 passenger cars, 49 trailers and 5 other vehicles.*

"Alignment Attended to Every 60 Days"

"EVERY sixty days our vehicles are checked over for front wheel and axle alignment. We are equipped with a toe-in gauge. Camber is checked with a protractor; caster by road-test; bent front axles with protractor; tracking with a cord; and bent frames with a protractor.

"Front axles, when bent, are removed from the vehicles and are straightened, using heat. We do not find it necessary to check and correct caster before checking the toe-in of the wheels."—*R. F. Hardin, General Shop Foreman, City Ice Company, Kansas City, Mo., operating a fleet of 240 trucks and 40 trailers.*

"Front-End Work Done Every 5,000 Mi."

"WHEEL and axle alignment is a factor in our preventive maintenance work, and we check the vehicles for same every 5,000 miles, using the Bear System; also some Manley equipment.

"For toe-in we use the Manley gauge; for camber, caster and tracking we use the Bear instruments. Front axles are straightened in the cars, but no heat is used.

"It is quite necessary to first check and correct caster before attempting to check for toe-in, and this procedure is followed out in our shop."—*O. Swanson, Foreman, Des Moines Electric Light Co., Des Moines, Iowa, operating a fleet of 36 trucks, 7 busses, 34 passenger cars and 8 trailers.*

"Preventive Maintenance Includes It"

"YES, wheel alignment is included in our preventive maintenance work. We check the vehicles approximately every six months and use measuring sticks also the Bear toe-in aligner.

"We do not have a camber or caster gauge. Bent frames and tracking are checked with lines and string. Front axles are removed from car and are straightened either hot or cold, as necessary, depending on the location of the bend.

"We realize that the better method is to check and correct caster before attempting to check for toe-in, although this procedure is not always followed in our shop."—*L. M. Ragsdale, Supt., Tenn. State Highway Garage, 555 Concord St., Knoxville, Tenn., operating a fleet of 250 trucks and 50 trailers.*

(Please tear out and mail to The Editor, The Fleet Owner, 90 West St., New York City.)

Question No. 21—Storage Batteries

(Note: This questionnaire does not apply to Electric Trucks)

What percentage of your fleet is equipped with batteries? .....

What is the average life of a starting and lighting battery? .....

Have you a battery department in your shop? .....

How do you test batteries? .....

What battery testing equipment have you? .....

Do you do your own recharging? ..... What equipment is used? .....

What is the approximate cost per battery charge? .....

Do you rebuild your own batteries? .....

What battery work do you farm out to battery shops? .....

Have you had any particular troubles with batteries due to solid tires; also due to batteries being mounted on running boards? (Please explain) .....

.....

What other battery troubles are you experiencing? .....

.....

.....

What battery make do you prefer? ..... What charger do you prefer? .....

A free booklet on battery testing and charging is offered to those answering this questionnaire. Want to have a copy, gratis? .....

How many vehicles in your fleet?

..... Trucks; ..... Busses; ..... Pass. Cars; ..... Trailers; ..... Others.

Help to keep this Department a Success! Swap Your Storage Battery Experience With Other Fleets.

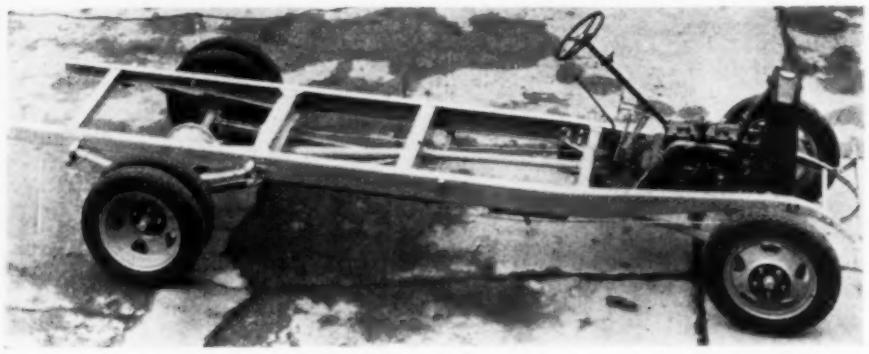
Name of Firm .....

Address .....

City and State .....

Your name ..... *Position* .....

AUTHENTIC SPECIFICATIONS OF THE



A PREVIOUS issue of this publication gave you the first few, sketchy details of Ford's new V-8 passenger car, which were all that were released up to the time of going to press. We could have burdened you, since then, with loads of "rumored" specifications, but did not, believing that if we could not get the details directly from the factory, and officially confirmed, inaccurate or incomplete data might be misleading, if not damaging.

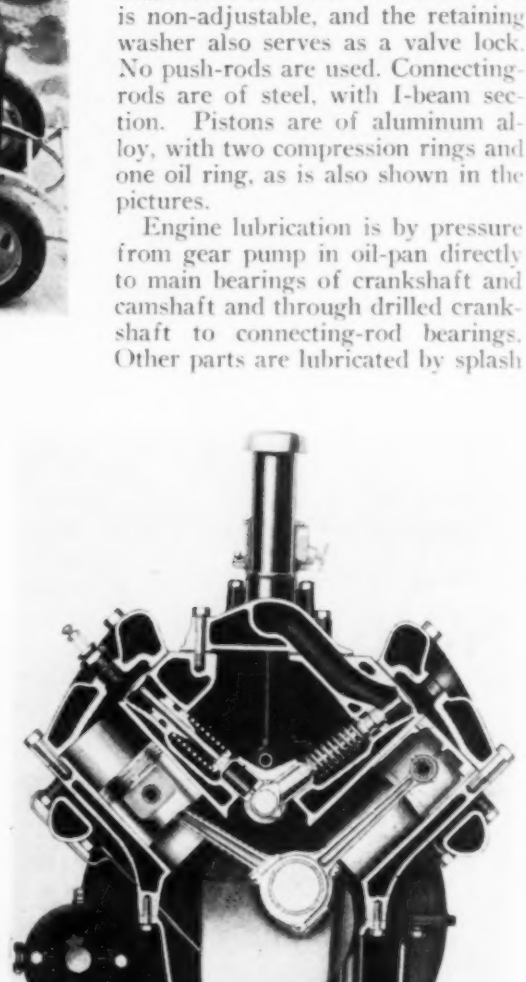
We are able to give this month, through the courtesy of the Ford Motor Company, complete and authentic dope on the new Ford V-8 passenger car, the new Ford Truck, and the new Ford Four. The illustrations accompanying this article will bear careful study, and since our readers have long since departed from the "primer stage" we shall allow you to write your own captions for the cuts shown on these pages.

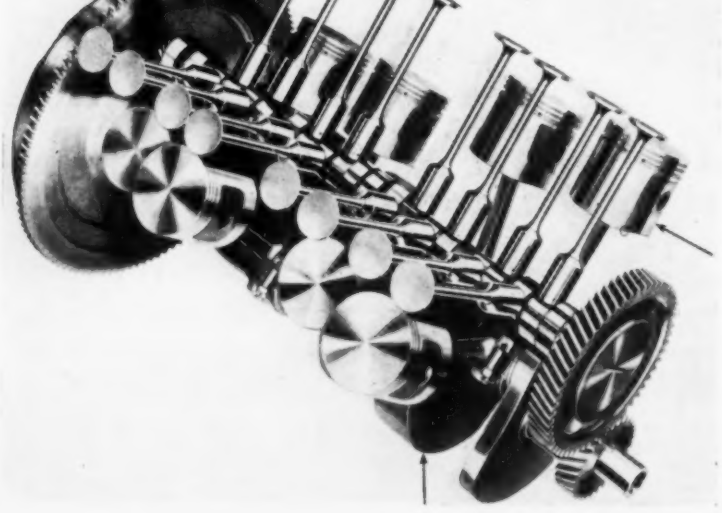
The major specifications of the new 1932 Ford Truck, which uses the slightly changed four-cylinder engine of last year, are shown in the box on the next page; a photo of the truck chassis appears on this page, directly above this column. Believing that the specifications themselves are quite self-explanatory, we shall devote our editorial story largely to the V-8, since with many and varied types of passenger and parcel bodies, passenger cars of the light type are used by practically all of the fleet operators reading this publication.

As outlined in our previous story, the Ford V-8 engine has a 90-degree crankshaft; a piston displacement of 221 cu. in.; bore and stroke of 3-1/16 x 3¾; S. A. E. h. p. rating 30; and brake horse-power, 65. Crankshaft is statically and dynamically balanced and is mounted on three main bearings, all 2 inches in diameter. Camshaft has three bearings, all 1.8 inches in diameter.

The valves are of chromium and nickel alloy, of one-piece design such as are shown in the cut-away photograph. The large mushroom end rests on the cam and is non-adjustable, and the retaining washer also serves as a valve lock. No push-rods are used. Connecting-rods are of steel, with I-beam section. Pistons are of aluminum alloy, with two compression rings and one oil ring, as is also shown in the pictures.

Engine lubrication is by pressure from gear pump in oil-pan directly to main bearings of crankshaft and camshaft and through drilled crankshaft to connecting-rod bearings. Other parts are lubricated by splash and spray, including the entire valve mechanism.





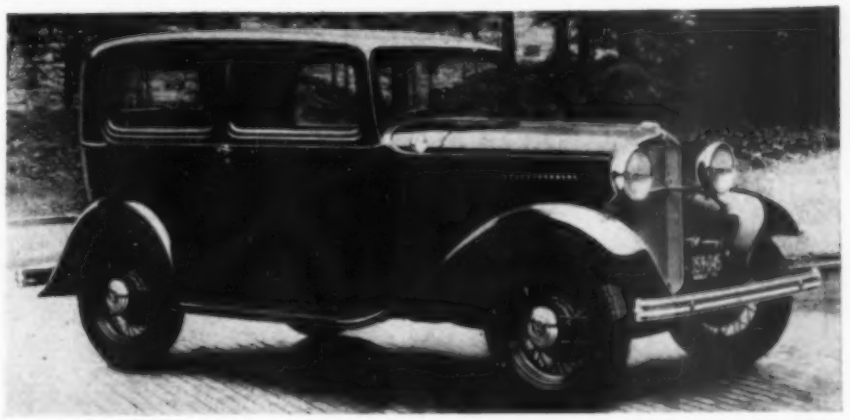
A down-draft carburetor with air silencer is mounted on the aluminum-alloy valve chamber cover, which also serves as the intake manifold, by means of internally cast passages leading to valve openings in the blocks. The central picture on this page shows this quite clearly. The carburetor is fed by a diaphragm fuel pump mounted on top of the engine and driven by a vertical plunger, operating off an eccentric on the camshaft. Manifold is of the hot-spot type. Exhaust passages are cored through the cylinder blocks and lead to manifolds mounted on the outside of the cylinder blocks.

The radiator is of the tube-and-fin type, with four rows of tubes, and is cooled by a two-blade, airplane-type fan. There are two centrifugal water pumps, one in each cylinder head at the front of the engine, both driven by a common belt, which also drives the generator, on the same shaft as the fan.

Battery ignition is used, with a Mallory dis-

NEW 1932 FORD CARS AND TRUCKS

tributor and coil. The distributor is driven directly off the end of the camshaft, by means of an offset slot, which makes it impossible to connect the distributor incorrectly. There are two sets of breaker points, one for each block and an automatic advance is built in. This is of the centrifugal type and is also vacuum-controlled so that when the throttle is opened suddenly, a braking action is applied to the governor. There is also possible a slight manual adjustment of the spark, about 7 degrees. Complete ignition is easily removed to replace, work on, or adjust the points.



Transmission in the passenger cars is of the synchronized, selective, sliding gear type, with helical cut gears, constant mesh, in second speed. The cutaway view on the bottom of this page also shows the flywheel and clutch in detail, the latter of which is of the single-plate type, with moulded asbestos composition facings. Clutch and transmission are in unit with engine.

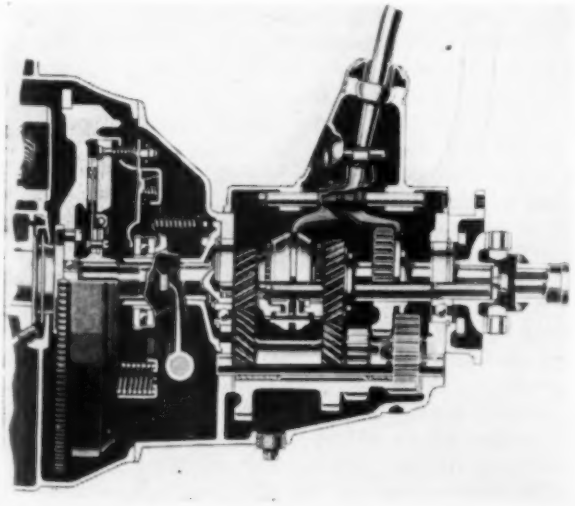
Front axle is of I-beam section. Rear axle is of three-quarter floating type, with spiral-bevel gear and pinion, mounted on roller bearings throughout. The standard passenger car gear ratio is 4.11 to 1. Brakes are of the four-wheel, mechanical, internal-expanding shoe type, the same set of shoes being operated by both foot pedal and hand lever. The total braking surface is 186 sq. in. Steering gear is of the semi-reversible, hourglass, worm-and-3-tooth-sector type, with self-adjusting thrust bearings. Ratio is 13 to 1.

Springs are of the transverse type, front and rear. Rear spring is mounted behind the rear axle on a special bracket. This permits a lower body mounting, without sacrificing clearance. All spring shackles and shock absorber links are rubber insulated, as is the engine mounting and front radius rod ball socket.

Tires are of the balloon type, 18 x 5.25, mounted on steel spoke, one-piece wheels. Wheelbase is 106 inches and turning radius is 19½ feet, with a 56-inch tread.

The Ford Four is similar to the eight, except

(*Please turn to page* 50)



Major Specifications of the New FORD TRUCK:

Engine—Four-cylinder, L-head, cast en bloc; bore 3⅞ inches; stroke 4¼ inches; SAE h.p. rating 24.03; brake h.p. 50 at 2600 r.p.m.; maximum torque, 128 ft. lbs. at 1400 r.p.m.; displacement 200.5 cu. in.; three main bearings; crankshaft statically and dynamically balanced; three camshaft bearings; chromium and nickel alloy valves; mushroom ends; aluminum alloy pistons; two compression and one oil rings; lubrication by gear pump with pressure to all camshaft and crankshaft main bearings; oil dippers in conn. rod bearings; splash lubrication to other parts; I-beam conn. rods; piston pins 1-inch in diameter, full floating.

Fuel System—Seventeen-gallon terne-plate fuel tank located across chassis beneath driver's seat; diaphragm type fuel pump located at right side of engine block and driven by lever actuated by eccentric on camshaft; 1⅛-inch carburetor; hot-spot manifold; machined valve ports. **Cooling System**—Tube-and-fin type radiator with four rows of staggered tubes; airplane-type fan; pump in cylinder head; capacity 5 gallons.

Electric System—Battery ignition, coil and distributor; full automatic spark advance; condenser relocated for isolation from heat; generator driven by fan-belt; two-lite, depressible beam headlamps; combination rear and stop light; instrument panel indirectly lighted; dome light in panel bodies.

Transmission, Clutch, Axles—Four-speed transmission of truck type; heavy-duty, single-plate clutch with moulded facing; I-beam front axle; three-quarter floating rear axle with spiral-bevel drive; wheel bearings beneath center of duals; 56½-inch tread; chrome alloy steel springs; front of transverse type; rear of semi-elliptic type with swinging shackles at each end.

Wheelbase, Steering, Frame, Tires, etc.—131½ and 157-inch wheelbase chasses are available; lengths 189 and 214½ inches respectively; depth of frame 7 inches; thickness 7/32 inches; rubber insulation in front radius ball socket; rubber-mounted engine; Brakes of 4-wheel type, internal-expanding and mechanically operated; internal emergency brakes on rear wheels; worm-and-sector type steering gear, of the ¾ irreversible type; Tires, front 6.00 x 20, 6-ply balloons; rear 32 x 6, 8-ply high pressure type; dual rear wheels with 6.00 x 20 balloon tires available; tapered steel disc wheels; road clearance 7-15/16 inches with dual rear tires and 8⅝ inches with high pressure tires.

Chassis Equipment—Coincidental steering and ignition lock; spare wheel and carrier; 17-gallon fuel tank; cowl assembly with ventilator; instrument panel and electrical system complete; pressure gun chassis lubrication.

"Schwarz Cycle" Studied for Fleets

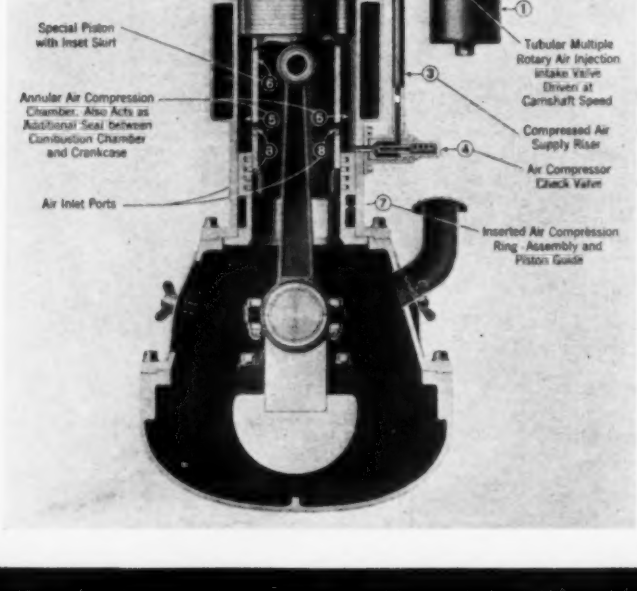
By J. Edward Schipper

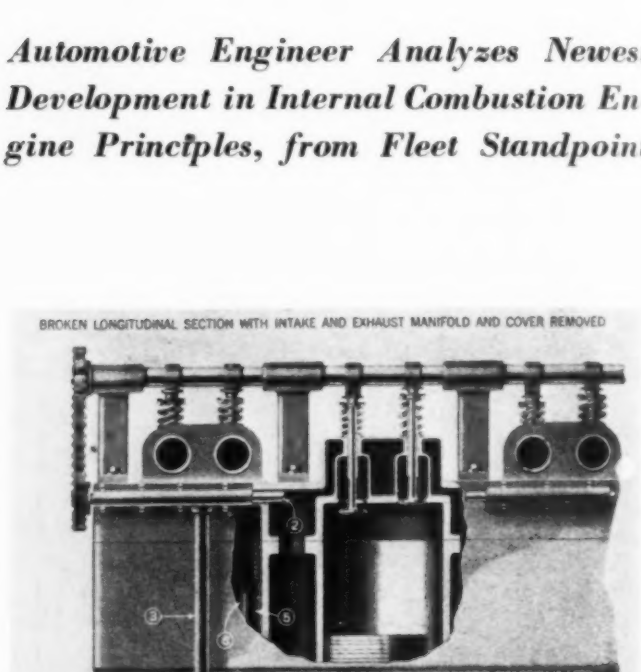
Automotive Engineer Analyzes Newest Development in Internal Combustion Engine Principles, from Fleet Standpoint

RECENT announcements by the Fuel Oil Motors Corporation, of the Schwarz Cycle, a new development in the engine field, are of interest to bus and truck operators because of the tremendous saving in fuel claimed for this new system. The first applications of the new cycle have been made in the marine field; stations for the conversion of engines to this cycle have already been established and are in operation. According to the Fuel Oil Motors Corporation, studies are now being made of the bus and truck industry for the purpose of developing information as to fuel economy made possible by use of the Schwarz Cycle.

Engineers of Fuel Oil Motors Corp., state that the use of the Schwarz Cycle in any two or four cycle gasoline engine of standard design makes possible the efficient burning of fuel oil on a basis comparable with the best Diesel engine economy and efficiency but without the high initial cost. It is also claimed that the Schwarz Cycle increases the power output from 30 to 75 percent and reduces the fuel consumption 25 to 50 percent, using either fuel oil or gasoline.

The new cycle is interesting in that it not only seems to solve to a large degree the problems of carburetion and distribution of gasoline fuel but also by means of the high turbulence created in the cylinder heads makes it possible to convert the conventional gasoline burning engine into a fuel oil engine without any changes other than the adoption of the Schwartz system itself.


CROSS SECTION
Conventional Carburetor - Intake and Exhaust Manifold
Metered Air Injection Inlet Nozzle
Special Piston with Inset Skirt
Annular Air Compression Chamber. Also Acts as Additional Seal between Combustion Chamber and Crankcase
Air Inlet Ports
Tubular Multiple Rotary Air Injection Intake Valve Driven at Camshaft Speed
Compressed Air Supply Riser
Air Compressor Check Valve
Inserted Air Compression Ring Assembly and Piston Guide


BROKEN LONGITUDINAL SECTION WITH INTAKE AND EXHAUST MANIFOLD AND COVER REMOVED
TYPICAL APPLICATION OF SCHWARZ CYCLE TO ENGINE OF STANDARD DESIGN

The Schwarz Cycle, explained simply, is a device to be added to the conventional motor. It injects air into the cylinder during the compression stroke. The air compressors are inbuilt, one being included in each cylinder of the motor and these force air into a common manifolding system which connects with the cylinder heads. Admission of air into the heads at 150 to 175 pounds pressure before ignition and momentarily afterwards, has the effect of creating a high degree of turbulence of the gas mixture, which is introduced into the motor in the conventional manner through a carburetor and manifolding system. The latter is separate and distinct from the one used to carry the compressed air to the head.

The greater degree of turbulence created within the cylinder, remedied to a large degree two of the most glaring defects of the conventional gasoline motor—the insufficient atomization of the fuel and the mixing of

this with the proper proportion of air before combustion occurs. By attacking this problem from another angle the Schwarz system makes it possible to secure a much higher degree of atomization and mixing. Furthermore, because of the excess air more complete combustion of the fuel is secured.

Three very important advantages arise out of the increased turbulence and added supply of oxygen due to the admission of air. First, the thermal efficiency is much higher, which in terms of truck and bus operation mean that more power is delivered at the rear wheels for every gallon of fuel used; second, more power is delivered for any throttle opening, which would be, of course, very important on heavy duty haulage work or, for that matter, on any type of bus or truck operation, and third, the motor is less susceptible to crankcase dilution because of the more complete combustion of the gases. This, of course, has its influence on reducing the cost of lubricating oil.

A test was recently made on a conventional gasoline engine equipped with the Schwarz system and fueled with oil of 28-32 Baume. The engine used was a four-cylinder unit taken from a 1931 passenger car. The regular carburetion system was left intact and the fuel oil was fed into the motor through it, the only change on the engine being merely the inclusion of the Schwarz system.

Running at 1,000 r. p. m., the motor showed a dynamometer rating of 14 horsepower and a fuel consumption of .52 pounds per horsepower hour. At 1500 r. p. m. the horsepower rating was 25 h. p. and the fuel consumption .51 pounds per horsepower hour. The same motor was switched over to gasoline and showed 12.5 horsepower rating at 1,000 r. p. m., with fuel consumption of .58 pounds per horsepower hour and at 1450 r. p. m. showed a rating of 23 horsepower and a fuel consumption of .54 pounds per horsepower hour.

The Fuel Oil Motors Corporation state, as a conclusion drawn from this and other tests, that practically any engine equipped with the Schwarz air injector system and operation ordinarily with gasoline as a fuel, may be simply adapted to the use of fuel oil.

In comparison with a regular high speed Diesel type motor, the adaption is said to perform with the same relative efficiency as to fuel units consumed. The practical advantage of making the adaption, instead of going over the regular Diesel construction is that horsepower for horsepower the construction costs of the adapted type are only a fraction of those for the Diesel.

The recent reports in March, 1932, issue of FLEET OWNER, on page 48, showing the record of the Diesel equipped truck which operated at a fuel cost per mile of .49 cents should be of interest to all fleet operators who are working on an extensive scale. The fact that this new cycle makes possible the same economy with a greatly reduced initial investment will make it of interest to all fleet owners, particularly those operating the larger fleets.

The Schwarz Cycle is the invention of Alfred Schwarz, who has had a long and distinguished career in the mining field. He is also the inventor of a number of gasoline cracking processes and originated a method for making artificial gas from oil, now in use by gas companies in various parts of the United States. His experiments looking toward the improving of efficiency of internal combustion engines were begun in 1928 and their results are controlled by the Fuel Oil Motors Corporation. An interesting booklet has been prepared that describes the Schwarz Cycle in detail giving actual permormance data. Interested fleet operators can obtain free copies by writing to the Editor or to Fuel Oil Motors Corporation, 120 Broadway, New York City, mentioning FLEET OWNER.

Vellumoid Needs No Cement!

A perfect and complete gasket material — Vellumoid needs no cement or shellac in applying. Vellumoid is a tough, compressible sheet the flanges bite into. With Vellumoid, you know you have a permanently tight connection that you can absolutely rely on.

Stock Vellumoid ready-cut gaskets for your fleet of cars, trucks, or busses, and sheet Vellumoid from which you can quickly cut or tap out any gasket desired.

Ask Your Jobber

VELLUMOID
THE REAL REPLACEMENT GASKET MATERIAL

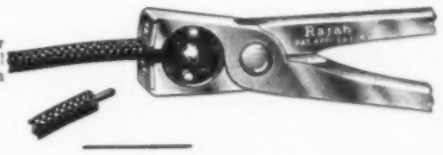
For the Oil, Gasoline, and Water connections

The Vellumoid Co., Worcester, Mass.

You Save Money

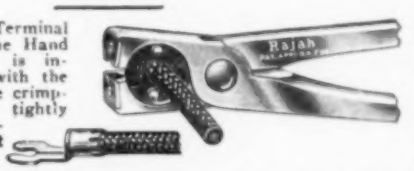
on rewiring jobs by using the new **Rajah** Hand Crimping **Tool**

This new tool crimps Rajah Terminals to ignition cable without the use of solder or any other tool. Note the simplicity of using it.



(Right) The cutter on end of Tool will remove just enough insulation.

(Left) Bend the exposed wire strands over end of Cable, then insert into ferrule of Terminal.



(Right) Now crimp Terminal to Cable by using the Hand Tool—The Terminal is inserted in the Tool with the ferrule flush with the crimping jaws—Compress tightly and you have a positive and **permanent** connection.

Tool with neat metal box containing 250 distributor terminals and 253 assorted spark plug terminals, $11.20. Tool alone $4.00.

THE RAJAH COMPANY, Bloomfield, N. J.

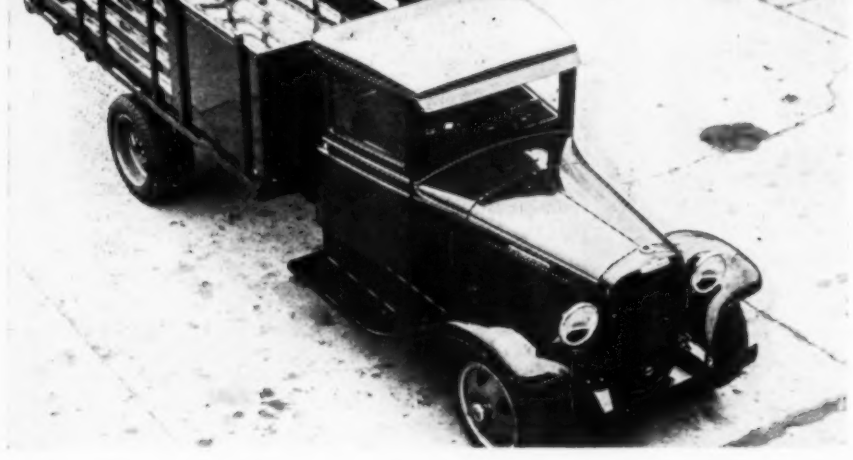
Send this coupon with your letterhead or business card for our special offer. You are sure to receive an unusual present. No obligation.

Name .....

Address .....

☐ Proprietor ☐ Service Manager ☐ Shop Foreman ☐ Mechanic

1½ TON REO HAS GOLD CROWN ENGINE



REO announces this month a new 1½-ton Speed Wagon, powered with the Gold Crown Engine. It is offered at a base price of $745, including the Gold Crown Engine which was formerly available only in the 2, 2½ and 3-ton Reo trucks, at higher prices, of course.

The engine develops 68 brake h.p. at 2,800 r.p.m. and develops in excess of 152 foot-pounds torque through the range of speed of 1,000 to 2,000 r.p.m., the makers point out. A 2-5/16-inch crankshaft is used, mounted on a total main bearing length of 12 inches. Bearings are of the interchangeable type, fitted without shims. Pressure lubrication is used, from a submerged gear pump, the oil passing through drilled and cored passages without the use of internal pipes. A downdraft carburetor is used, fed by a fuel pump.

The four-speed transmission provides ratios of 1.86 to 1 in third, 3.55 to 1 in second, 6.61 to 1 in first and 8.16 to 1 in reverse. The rear axle, of full-floating, spiral bevel type, with straddle-mounted drive pinion, carries standard ratio of 5.28 to 1 on the 140-inch wheelbase jobs and 5.83 to 1 on the 164-inch. In addition to these two ratios, 6.6 to 1 gears are offered for use where service conditions justify.

There are long, flexible springs, 40 x 2 inches in front and 50 x 2½ in the rear. Cam-and-lever steering and roller thrust bearings at the steering knuckle pivot bolts aid steering. Tapered roller bearings are used in both front and rear wheels. Reo practice brakes are of the two-shoe, hydraulic, internal type, fully inclosed. Master cylinder is of the self-replenishing type. Service brake areas are of 246 square inches.

Reo has announced that in addition to the six-cylinder Speed Wagon line powered by the Gold Crown engine, priced at $745 F. O. B., Lansing, for the chassis, it will continue its four-cylinder line priced at $625. Both six and four-cylinder Speedwagons are available as tractors for semi-trailer operation, as well as with a full line of Reo-built standardized bodies. When these Speedwagons are built for trailer operation vacuum brakes are fitted.

Complete semi-trailer outfits are priced at $1,575 up, F. O. B., Lansing, Mich. The new 1½-tonner has a loading space of 102 inches behind the cab on the 140-inch wheelbase job, and loading space of 120 inches on the 160-inch job. When writing Reo for literature, you'll mention FLEET OWNER, won't you?

8-TON, 6-WHEELER FEDERAL'S LATEST

A NEW 8-tonner is the latest six-wheel product of the Federal Motor Truck Company, Detroit, Michigan. The development of this model follows the 3-ton and the 4 to 5-ton 6-wheel models which are now in service.

With the introduction of this new model, designated as the T10SW, the advantages of six-wheel design are still further extended into the field of heavy-duty transportation. Like other Federal single drive six-wheelers, the driving axle is placed at the rear with the dead axle ahead, thus providing increased traction to the driving wheels.

This new Federal 8-ton 6-wheeler carries a gross rating of 28,000 pounds. Power is provided by an 80 horsepower six-cylinder engine with 7-bearing crankshaft—bearing diameter 2¾". It is built in three wheelbase lengths, 188", 200" and 224", listing at $3895, $3945 and $4045 respectively. It has 20" x 7" ventilated disc wheels with 34" x 7" tires, duals on all four rear wheels.

As on other Federal six-wheel models, six-wheel hydraulic brakes are provided. These are 16 in. x 2¼ in. front and 17¼ in. x 4 in. rear—one on each wheel. They are power-operated by vacuum booster, providing braking power with easy effort on the part of the driver.

In its flexible rear end construction this model is similar to other Federal six-wheelers. With this design, rear wheels are permitted to adjust themselves independently to road irregularities, thus assuring easy riding and protection to cargo, the makers state.

All spring pins connected with the rear axles of this unit and all trunnion pins are mounted on Federal patented Reservoil bearings, which are automatically lubricated.

Increased flexibility of the rear end is obtained by the use of swivel brackets for connecting the rear springs with the rear driving axle. These take the place of the ordinary spring seat, allowing each axle to move up and down freely in a direction at right angles with the chassis frame. Swivel brackets also accomplish the very important function of preventing all of the twisting action of the springs from being transmitted from the road to the frame and its body members, thus prolonging the life of body and cab as well as providing greater riding comfort for the driver.

New Trailer for Meat Hauling

FROM 12 to 15 tons of meat are being hauled daily between Milwaukee and Chicago by a new 20-foot refrigerated trailer recently added to the service fleet of the Advance Transportation Company of Chicago. This new addition is the tenth refrigerator body in this fleet.

Insulation in walls and ceiling consists of 3 inches of Dry-Zero blanket which gives sufficient protection so that no refrigeration is required during nine months of the year. During the three summer months three 55-gallon drums of crushed ice placed in the body will give adequate refrigeration to keep the temperature below 40 degrees for 24 hours.

The entire body is of oak construction sheated on the outside with ¼ inch Plymetl and inside with ⅝ inch fir. A new method for protecting the floor insulation against moisture penetration is used. A specially built water-tight pan arranged below the top floor boards and fitted with drain pipes prevents any surplus moisture from seeping into the insulation. Two doors are provided, one on the side and a double door in the rear equipped with medium weight Miner lock and spring. The body weighs approximately 4500 pounds and is mounted on a narrow bed trailer. It was built by H. Barkow Company of Milwaukee.

To Form Reciprocal Operators Assn.

PHILIP L. GREENBURG announces the formation of a Reciprocal Truck Operators Association with headquarters at 819 Bankers Building (629 S. Hill St.), Los Angeles, California.

The purpose of this truck transportation organization as stated by Mr. Greenburg is to give a national motor freight truck service to shippers, by a group of certificated truck lines operating under a reciprocal relations plan in all large centers of distribution with a store door to store door pick-up and delivery system.

Each member continues to do business under his own company's name and there will be no change in ownership of the respective truck companies.

The activities of the group will be confined to the development of reciprocal shipments and Mr. Greenburg will maintain a central clearing house at Los Angeles to which each member of the association will report shipments from city to city. By this means it is planned to induce shippers to use the truck lines of the association in each city represented.

Combination truck, rail, and water routes will be used as may be most expedient and economical to the shipper and through rates will be established to and from all points served by the member truck lines. Shippers will be able to obtain this information by communicating with the member truck line at shipping point.

It is planned to carry on an aggressive advertising campaign in each large trading center to advise national distributors and shippers of the complete freight transportation service which is offered by this association of motor truck carriers.

Each member will be assessed a nominal charge to defray the clearing house expense and the cost of the advertising campaign. Mr. Greenburg is now in communication with a number of the leading trucking concerns of the country. Only those lines who are known to be reliable, dependable, and responsible will be accepted to membership.

Studebaker to Merge Sales Units

A PLAN for merging certain of the sales activities of all units of The Studebaker Corporation has been announced. The plan is unique in that each company maintains its separate identity and it is individually charged with the responsibility for all sales promotional activity including advertising. The only activities which are consolidated are those which can be most efficiently performed for all companies by one group of men, such as securing dealer representation, wholesale orders and assisting dealers to make their operations more profitable. The consolidated sales activity will be carried out under The S. P. A. R. Sales Corporation (Studebaker, Pierce-Arrow, Rockne) of which P. G. Hoffman is President. G. M. Graham, R. H. Faulkner and J. M. Cleary have been appointed Vice Presidents. E. C. Mendler will continue as Vice President in charge of the parts and accessory division, G. D. Keller will be General Sales Manager and L. K. Manley, Manager of Branches. All the officers of the company are well known in automobile trade circles and have had long experience in dealing with sales problems.

This new sales set-up makes immediately available to the Pierce-Arrow, Rockne and S. P. A. truck dealers the facilities of the 18 regional offices formerly serving Studebaker dealers only. Twelve of these regional offices operate parts and accessory depots and all of them have facilities available for warehousing new cars.

Use

DETROIT

PISTONS *and* **PINS**

on all Maintenance Jobs and watch your costs go down! Detroit Pistons duplicate original equipment but can be supplied to any desired specifications to suit individual requirements.

As a special service to fleet operators, we shall be glad to quote on standard pistons—also on pistons grooved specially or otherwise changed from original design to meet your particular requirements. We can fill any order for pistons and pins.

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1248 Bedford Ave., Brooklyn, N. Y.
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1925 E. 55th St., Cleveland, Ohio
110 Brighton Ave., Boston, Mass.
544 Spring St., N.W., Atlanta, Georgia
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2705 Leavenworth St., Omaha, Nebraska

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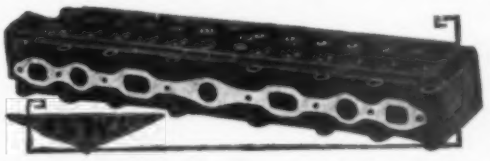
***Lower* Maintenance Cost**



Cast from Chrome-Nickel Iron, accurately designed, carefully machined, Bates Wohlert Cylinder Heads are easier to install and give longer service. They are the perfect replacement for Chevrolet 4 & 6, Ford, Plymouth and Pontiac.

There is a distributor conveniently located for fast service. Write today for his address and complete catalog.

BATES WOHLERT CO., Lansing, Mich.

ARMORPLY

A SUPERIOR METAL FACED PLYWOOD PANEL FOR BODY CONSTRUCTION

Write for samples and prices

UNITED STATES PLYWOOD CO. INC.
603 W. 36th ST. NEW YORK CITY

REFRIGERATED BODY DEVELOPMENTS

THE growing demand for refrigerated bodies is being reflected in the increasing sales of Armorply metal-covered panels, according to the United States Plywood Co. Inc., 603 W. 36th St., New York City.

The strength, light weight and insulating value of Armorply makes it an ideal panel for such equipment, the makers point out.

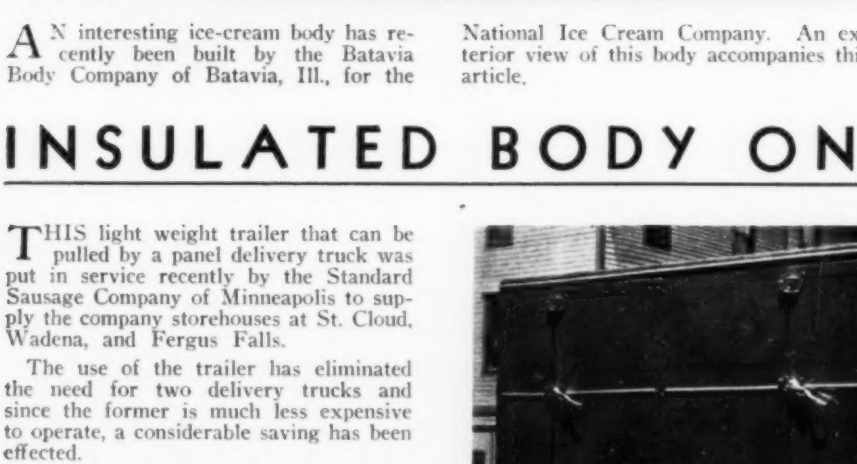
Recently this material was used in a fleet of refrigerated meat bodies for the Gobel-Loffler, Inc., Washington, D. C. This is a division of Adolph Gobel, Inc., of New York City. The bodies were built by the York-Hoover Body Corporation of York, Pa.

Prior to the addition to the Loffler fleet there were more than 130 bodies added to the Gobel and Merkel fleets in New York. Many of these bodies were paneled with Armorply.

Large quantities of Fir plywood panels also are being used for linings and roofs, one recent order placed with the United States Plywood Co. Inc., requiring 2,400 panels for one fleet order.

Further information on "Armorply" will be cheerfully sent on request to any fleet operator. Address United States Plywood Co., Inc., 603 W. 36th St., New York City. A new price-list features substantial reductions, we are informed. You'll mention FLEET OWNER won't you?

A MECHANICALLY REFRIGERATED UNIT



AN interesting ice-cream body has recently been built by the Batavia Body Company of Batavia, Ill., for the National Ice Cream Company. An exterior view of this body accompanies this article.

This body is mounted on a Diamond-T truck as may be noted and is of 450-gallon capacity. It is mechanically refrigerated with a Kelvinator condensing unit RB-530 operated by a new type of constant-speed drive transmission unit.

The body is insulated with from 5 to 6 inches of Dry Zero in the walls, ends and roof and it is cork-sealed with Korite in the floor.

Body framework is an individual design of staggered post construction, built of hardwood throughout and completely panelled with Plymetl.

This information comes to us through the courtesy of Haskelite Manufacturing Corporation, 120 S. La Salle St., Chicago, Ill., to whom any inquiries regarding this body may be addressed.

INSULATED BODY ON A TRAILER

THIS light weight trailer that can be pulled by a panel delivery truck was put in service recently by the Standard Sausage Company of Minneapolis to supply the company storehouses at St. Cloud, Wadena, and Fergus Falls.

The use of the trailer has eliminated the need for two delivery trucks and since the former is much less expensive to operate, a considerable saving has been effected.

The trailer body is 12 feet long, four feet wide and four feet, two inches high. It is mounted on a light duty, four-wheel, balloon-tired Highway trailer. The body is constructed along the usual lines with two refrigerator type doors on each side, equipped with Miner locks.

Insulation consists of two inches of Dry-Zero blanket throughout. Ice and salt are used in warm weather to maintain the 45 degree temperature which is desirable for this type of load.

Although the trailer is capable of handling loads up to 8,000 pounds, it is seldom that a load in excess of 4,000 pounds is carried. Highway Trailer Company is the builder.

Complete details as to the trailer and body can be obtained by addressing Highway Trailer Company, Edgerton, Wis. You'll mention FLEET OWNER when writing, won't you?.

Parker Heads Reo Truck Division

ANNOUNCEMENT was made recently by Elijah G. Poxson, General Sales Manager of the Reo Motor Car Company of the appointment of W. Carl Parker as head of the truck division.

Mr. Parker was previously associated with Reo for many years as head of the truck division and served in that capacity when Reo entered the Commercial Car Field in 1911.

Subsequently Mr. Parker originated the name "Speed Wagon," which is now known throughout the world, and continued to develop the truck division until Reo became one of the largest producers in the industry.

Reduce Fatigue and Reduce Accidents

FATIGUE, caused by lack of sleep or long working hours, is a highly important accident factor, according to the National Safety Council. More automobile accidents occur during the late afternoon hours when workers are going home than in the morning when they are driving to work. Cross-country truck drivers are more prone to accidents during the late hours of the day.

Recognizing the hazard of fatigue, many firms operating taxicabs, buses and trucks have placed definite limits on both the mileage and the hours which their drivers may work, the Council says. One of the most revolutionary moves along this line is shown in a recent order sent to all its regional managers by one of the largest bus companies in the country. It says:

"A. When a driver has completed a trip or tour of duty requiring him to drive a distance of 150 miles or more, he must not be permitted to make a return trip or go on any other trip or tour of duty until he has had at least eight hours of rest.

"B. Regardless of the number of miles driven, when a driver has completed a trip or tour of duty and has had to be on duty eight hours or more, he must not be permitted to make a return trip or go on another trip or tour of duty until he has had at least eight hours of rest."

Experience Endorses "Self-Sealing" Tubes

OVER two and a half million tire miles have been piled up by the thirty passenger coaches of the Detroit and Canada Tunnel Company, operating from down-town Detroit to Windsor, Canada, by way of the tunnel under the Detroit River. A record that is interesting because it has been accomplished without a minute of road delay for tire trouble.

This remarkable record has been established in testing new type "self-sealing" tubes which are carried in the front tires of the tunnel busses. Although the distance already covered without a puncture, definitely establishes the dependability of this type of tube (several makes of which are available), the test will be carried on indefinitely, officials said.

Because of the splendid record of the Detroit and Canada Tunnel Company for speed and safety in handling public traffic through the tunnel, officials of the tunnel company subject not only tires, but all equipment used in the tunnel service to severe tests before accepting it for public service.

"The experience of running our fleet over two and a half million tire miles without a moment's road delay for tire trouble convinces us that this type of inner tube is dependable equipment for public carrier service," T. P. Pinckard, General Manager, Detroit and Canada Tunnel Company said.

WHAT this *new* TRUXMORE is

◄ and how it saves for you ►

The new TRUXMORE is the only Third Axle with the fully patented LOAD DISTRIBUTION ADJUSTOR and T-E GRAVITY SPRING SUSPENSION system—exclusive features that correct the faults of other past and present dead third axles. It is the outstanding cost-reducing factor in motor transportation—guaranteed to safely, legally, profitably haul double payloads—guaranteed to provide lowest operating cost known, to produce largest profit and return on investment. Get the facts today!

Write for Folder "Load 'em with Dollars"

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A few good Distributor Territories still available

O'Brien's Enamels

Durable --- Quick Drying

Backed by over fifty years' experience —O'Brien's quick drying, durable enamels and undercoats, designed especially for fleet maintenance, offer not only the most lasting finish but as well the most economical system known.

The coupon below will bring to you the most valuable information you have ever had on painting systems as well as a full pint sample of the enamel itself.

O'BRIEN VARNISH COMPANY
South Bend, Indiana

Send me sample of enamel and full information on the O'Brien system of fleet maintenance.

Name .....
Firm .....
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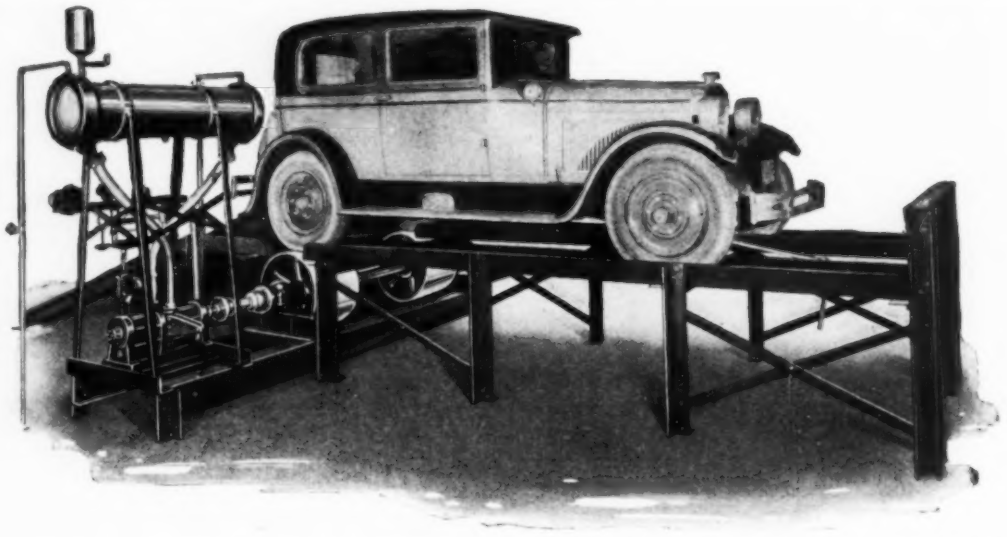
MACHINE ELIMINATES ROAD TESTING



A GREAT deal of serious attention is now being given to the substitution of laboratory rear wheel or front wheel tests for road tests, not only on account of the saving in time and expense, but also because of the greater safety and the freedom from costly damage suits resulting from accidents while cars or chasses are being tested on the road.

Having the foregoing in mind, as well as the widespread interest of fleet service station managers and others in New York and the vicinity, in front and rear wheel tests, the Metal Stamping Co., 11th St. & 44th Ave., Long Island City, has installed at its plant, near Queensboro Bridge Plaza, a rear wheel dynamometer which has sufficient capacity to test cars with engines developing up to 250 horsepower.

Tests may be easily and quickly made on new or overhauled cars for the purpose of checking the carburetor setting as well as the functioning of the ignition and lubricating systems. Study may also be readily made of abnormal engine or chassis noises.

Tests will include a report on the performance of the car, giving the power developed at the driving wheels at various car speeds from the lowest to the highest.

These tests will be made under the supervision of Joseph Tracy, well known as the inventor of the Fluid Dynamometer now being manufactured by the Metal Stamping Company. The machine on which the tests will be made is called the "Car Testometer" and is illustrated herewith.

The manufacturers of this piece of equipment are planning to introduce a larger model of the Car Testometer, suitable for testing heavy trucks and busses. It will probably be a pit installation and will be available to fleet operators throughout the country. Although no definite date has been set for the introduction of the larger model, interested fleet operators can get further details by writing directly to Metal Stamping Company, Long Island City, N. Y.

AUTOCAR ANNOUNCES NEW 1½ TONNER

DETERMINED efforts by the Autocar Company, Ardmore, Pa., to produce a powerful and long-lived truck at reasonable list-price, have borne fruit in their Model R 1½-ton Autocar, now on sale. It is a 6-cylinder dual-rear-wheel truck with standard wheelbases of 159, 171, and 189 inches. Its gross weight is 14,000 pounds.

The specifications of this model are briefly given here: It is powered by a newly designed Autocar Blue Streak engine with 3¾-inch bore and 4¼ stroke. This gives the large piston displacement of 314 cubic inches, and the N.A.C.C. horsepower rating of 33.75.

At its relatively low governed speed of 2400 r.p.m. the engine yields 75 brake horsepower. The crankshaft rides on seven 3-inch main bearings with a total bearing length of 12¾ inches.

Power application is through an Autocar 4-speed transmission with low ratio of 6.41 to 1 and a direct high gear. The standard rear axle has a 5.22 ratio, and is full-floating, spiral-bevel drive, also of Autocar manufacture.

At its governed speed the loaded truck is good for 45 miles per hour and a grade of 4.8% in high gear, the manufacturer's announcement states.

Model R is supplied with hydraulic brakes. Four Lockheed internal-expanding shoes have a total of 388 square inches of lining. Another feature is its channel steel frame, with cross section measuring 6⅞ x 3 x 3/16 inches.

The Autocar Company expects a wide market for Model R among public utilities, packers, and all delivery-truck buyers, the initial announcement states.

Indian Announces Police Sales

THE Indian Motorcycle Company, Springfield, Mass., announces delivery of 75 powerful solo motorcycles to the New York City Police Department as well as smaller sales, ranging from one to fifteen machines of two and four cylinder types to 26 other police departments during the past few weeks, according to James A. Wright, sales manager.

White to Sell 1½-Ton Indiana

A NEW one-and-a-half ton, six-cylinder Indiana truck, powered with a 68 horsepower engine and having an allowable gross weight of 10,000 pounds, will be sold and serviced by The White Company, of Cleveland, Ohio.

Newly designed and embodying recent important engineering advancements, this new truck, designated as Model 85, will offer a new unit for all classes of business. Five wheelbases and a complete line of bodies for every truck need are available.

The six cylinder, seven bearing, Hercules "L" head type engine, 3-5/16"x4-¼", has a piston displacement of 263 cubic inches. Flexible control, quick get-away and acceleration are enhanced by a down-draft carburetor; easy steering through cam-and-lever type; four-wheel hydraulic brakes and 6.50-20 dual tires as standard equipment, are a few of the features of this new truck, as emphasized by the maker.

This model is recommended by the White Company for laundries, grocers, retail delivery, bottlers, dairies and ice cream manufacturers, meat packers, printers and newspapers, farming, florists, small furniture stores, dry cleaners, plumbers, produce and fruit, etc.

Distribution of these new models to the nation-wide factory branch and dealer organization of the White Company will start at once, a recent announcement states.

Interesting West Coast Figures

MOTOR truck operators of southern California purchase yearly $78,960,000 worth of motor truck parts and accessories, tires, fuel and lubricants, not including labor, according to a survey just completed by Sidney J. Beer, who is identified with the trucking industry of the Pacific coast.

This large buying power is concentrated in 130 franchise and interstate truck lines operating out of Los Angeles and 3500 manufacturing, wholesale and retail merchandising, importing and exporting and public warehouse companies in southern California.

From figures obtained from reliable sources, it is disclosed that the average cost of operating a truck for a year is $4200 on the basis that a truck travels 50,000 miles a year. This cost is divided into parts and accessories, not including labor, $500; tires, $1500; gasoline, $2000; oil and grease $200, or a total of $4200.

The average number of trucks owned by manufacturing, merchandising, importing and exporting and public warehouse companies is five each, or a total of approximately 17,500 trucks.

On the basis of a cost of $4200 a year for each truck, the purchasing power of this group is $73,500,000. This is segregated as follows: parts, supplies and accessories, not including labor $8,750,000; tires, $26,250,000; gasoline, $35,000,000 and oil and grease, $3,500,000.

The 130 franchise and interstate truck lines operate an average of ten trucks each or a total of 1300 trucks, and spend yearly on parts and accessories, $650,000; tires, $1,950,000; gasoline, $2,600,000 and lubricants, $260,000, or a total of $5,460,000.

The total for the two groups is $78,960,000.

These figures on average expenditures per truck are in line with the results of a nation-wide study of truck operating costs.

Stresses "Balanced" Chassis Weight

"IT is true that the strength of a motor truck chassis cannot be measured by sheer weight alone," says M. L. Pulcher, President of the Federal Motor Truck Company, Detroit, Michigan. "Excess pounds of pig iron do not tell the story. Unless weight is properly distributed it only adds to operating cost without a compensating reduction in maintenance.

"No substitute has, however, been discovered for *balanced* chassis weight—added weight where strains are greatest—strength where strength is needed. That's sound reasoning—you cannot get away from it. Adequate weight, properly distributed, means dependable performance and long vehicle life.

"Every truck buyer pays for adequate *balanced* chassis weight, whether he gets it or not. It's to his decided advantage to see that he gets it with his initial investment rather than to pay for it in excess operation cost every mile the truck runs. Purchasers of commercial haulage equipment will do well to thoroughly check into this matter of balanced chassis weight."

Truck Assn. Holds Annual Dinner

SEVERAL hundred fleet operators attended the annual banquet of the Motor Truck Association of America, held in New York City last month. I. A. Hungerford, of Borden Farm Products presided.

Motor Vehicle Commissioners of two states, Charles A. Hartnett of New York and Harold G. Hoffman of New Jersey, were among the speakers. The gathering represented approximately 150,000 automotive units, being operated by those fleet owners in attendance.

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a GUARANTEED
SPARK PLUG

DON'T take our word for it that this is the plug you've been looking for. Ask us to prove it by sending a list of satisfied fleet owner users.

IF the electrodes in your present plugs are burning up and the insulators are cracking and breaking you owe it to yourself to try the new AUBURN "H" Series Spark Plug.

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Now owned and operated by Ley Garage Corp.
Your car is never touched by human hands. Rates as low, if not lower, than many other Garages offering less satisfactory service. From $12.00 monthly upwards.
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Drop a line today to
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18,099 AUTOMOTIVE "WHOLESALE CONSUMERS"

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Such is the Extent of the Automotive Fleet Market Which is Made Up of Approximately 1,500,000 Vehicles and Covered Monthly by

"FLEET OWNER"

A Word About the "C. C. A."

C. C. A. means "Controlled Circulation Audit," an organization composed of manufacturers, advertising agencies and publishers, the object of which is to make available verified circulation information on publications having free or "controlled" circulation.

Since FLEET OWNER is a controlled circulation publication, we lost no time in joining the C. C. A. and point to our "Charter Membership" with pardonable pride.

Our C. C. A. membership gives manufacturers and advertising agencies the opportunity of obtaining definite confirmation of circulation and actual figures on coverage claimed.

Copies of our C. C. A.-audited Circulation Statement are free for the asking. The immenseness of the fleet market and other information it contains, make interesting reading.

Ask for Complete Details of this Huge Coverage

"FLEET OWNER"

Charter Member, Controlled Circulation Audit, Inc.

The Ferguson Publishing Co.
90 West Street New York, N. Y.

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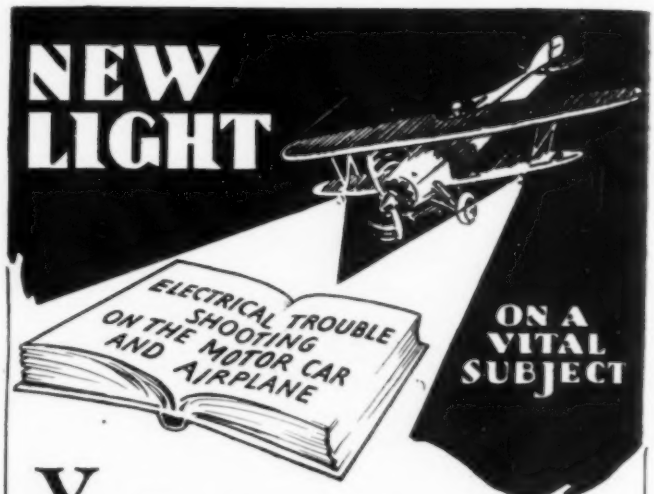

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A new edition is just off the press. It covers everything from wiring to armature rewinding. Takes up generators, starters, cutouts and regulators on all cars, trucks, busses and airplanes. Contains scores of test kinks that will be found handy in the shop. Explains test bench construction; takes up flat rates; in fact anything electrical in the automotive game.

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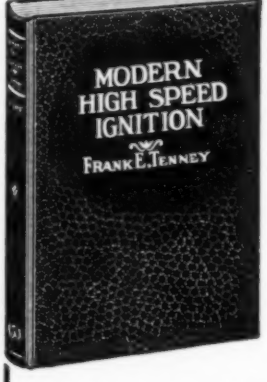

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At last we are able to offer a book that gives you the real "low-down" on High Speed Ignition. Tells you all about the new dual and twin ignition distributors—how to synchronize correctly—the new tools for synchronizing and how to use them—not too technical—no guesswork. This is a 130-page book, chock full of illustrations—134 in all. Absolutely indispensable to the service man. Will pay for itself on the very first job. Sent postpaid on receipt of $3.50.

A Book written by a Mechanic for the Mechanic—Every Service Man needs it —Use the Coupon and be Informed.

The Ferguson Publishing Co.
90 WEST STREET NEW YORK CITY

Please send me a copy of "High Speed Ignition" for which I enclose $3.50 in payment. I understand that if I am not entirely satisfied with the book I will return it and you will refund my money in full.

Name .....
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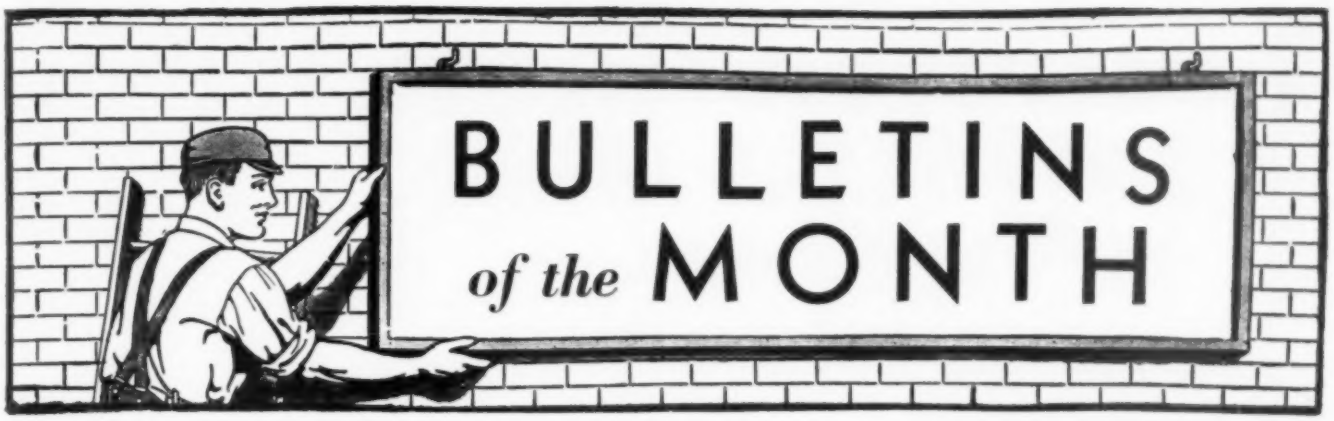
City ..... *State* .....



FORMATION of a Reciprocal Truck Operators Association, with headquarters at 819 Bankers Bldg., Los Angeles, Calif., is announced by Phillip L. Greenburg. Its purpose is to give a national motor freight truck service to shippers, by a group of certificated truck lines operating under a reciprocal relations plan in all large centers.

A BILL recently introduced and passed by the Massachusetts State legislature, requiring all new motor vehicles to be equipped with shatter-proof safety glass windshields after January 1st, 1934, was signed by Governor Ely last month. This bill supplements the present law requiring safety glass in the windshields of all busses, taxicabs and vehicles for hire.

AN encouraging picture of business conditions is reported from the Pacific Coast. "There people are sensibly optimistic," according to M. L. Pulcher of the Federal Motor Truck Company, who has just returned from a trip. "They are not expecting big things for the immediate future, but are practically unanimous in the opinion that we are now definitely on the upgrade."

THE purchase by Continental Motors Corp., of the assets and business of DiVco Detroit Corporation is announced. The latter company manufactures a special type of retail milk delivery truck that is widely used by many dairies. It is especially designed for multiple-stop delivery and is powered by a Continental Red Seal engine. A subsidiary known as Continental DiVco Company will carry on this business.

APPOINTMENT of Robert S. Muir as Regional Truck Representative with headquarters in Chicago, Ill., was announced recently by O. J. Paul, Chicago Regional Manager for Dodge Brothers Corporation. Mr. Muir will have complete jurisdiction over all truck sales operations in the Chicago region and will supervise the work of truck sales representatives.

AS a further step in the cooperative movement between the motor vehicle manufacturers and automotive fuel producers, the Ethyl Gasoline Corporation has joined the "Buy a New Car" campaign, it was announced at headquarters of the Ethyl Corporation. Ethyl will run a series of paid advertisements featuring this slogan in a score of leading periodicals.

FREEMAN AND SONS, INC., of Miami, Florida, veteran Reo distributors, have opened a branch in Jacksonville from which they will handle the distribution of Reo passenger cars, Speed Wagons and heavy-duty trucks in a territory which includes 25 out of the 54 counties in Florida and 27 counties in Georgia, according to an announcement made by Elijah G. Poxson, General Sales Manager of the Reo Motor Car Company.

ED. J. BUTLER has recently become vice-president in charge of sales for Associated Parts, Inc., Toledo, Ohio. Mr. Butler was formerly connected with the Toledo Steel Products Co., and joined Associated Parts last November as sales manager.

APRIL production of motor vehicles in the United States amounted to 146,584 *units, according to the preliminary estimate released by the National Automobile Chamber of Commerce. This was an increase of* 15 *per cent over the output for the preceding month, and* 58 *per cent under April,* 1931. *According to this estimate, motor production for the year to date is* 51 *per cent under* 1931.

INCREASES in production schedules for April and May, as a result of important orders from automotive manufacturers for wheels, brakes and brake drums, are announced by Budd Wheel Company. These increased schedules call for an April production larger than that of any month since October, 1931, and May volume greater than that of any month since last May.

J. B. Siegfried, vice president in charge of sales, has announced the appointment of Glenn A. Sanford, well known in automotive circles, as sales manager of Motor Wheel Corporation. Mr. Sanford's appointment was effective May 1st.

FIFTY-SEVEN employees of W. W. Kirby & Son, Inc., engaged in commercial trucking business at Trenton, N. J., have been covered with life insurance through the acquisition of a group policy through the Prudential Insurance Company of America. The total amount of the policy involved is $73,000.

OPENING of the spring buying season has had a stimulating effect on the motor truck business, according to officials of Dodge Brothers truck division. The upward trend started on February 20th. Since then, sales have steadily increased, it is reported.

ANNOUNCEMENT is made by The Piston Ring Company, Muskegon, Mich., of the establishment of a warehouse stock of "sealed power" pistons, pins and cylinder sleeves for service to distributors in the San Francisco territory. A carload of merchandise has recently been shipped to the new warehouse, in that city.

THE Reading Railroad will shortly operate the first stainless-steel, pneumatic-tired rail car of the Budd-Micheline type in this country, according to announcement made by the Edward G. Budd Mfg. Co. Order has been entered for a new 56-passenger job, powered by an 85 h.p. Diesel engine. It will be placed in service between Princeton and Trenton, N. J.

NEW low prices on "single duty" complete sets of piston rings for Fords and Chevrolets, were announced, effective April 1st, by The Perfect Circle Company, Hagerstown, Ind. These new prices are the lowest in Perfect Circle's history, it is declared.

A DECIDED improvement in sales is reported by the Sterling Motor Truck Company, Milwaukee, which firm closed the month of April with more unfilled orders on hand than at any other similar period since the spring of 1930. Over $100,000 worth of orders were closed on April 30th alone, which makes it the largest single day's sales since April 1929.

AT the annual meeting of stockholders of The White Motor Company held last month in Cleveland, all members of the existing board of directors were re-elected and T. R. Dahl and George H. Kelly were elected as additional members. Following the meeting A. G. Bean was re-elected president and all other officers were re-elected as well.

AN increase of 13 per cent in shipments of Diamond T trucks during the first quarter of 1932 as compared with the same period last year is reported by C. A. Tilt, president of the Diamond T Motor Car Company. The increase is attributed to the introduction of new models at lower prices.

M. L. PULCHER has assumed active charge of sales for the Federal Motor Truck Company, following the resignation of Henry Krohn, former vice-president, in charge of sales. These additional duties are taken on by Mr. Pulcher in addition to retaining his position as president of the company.

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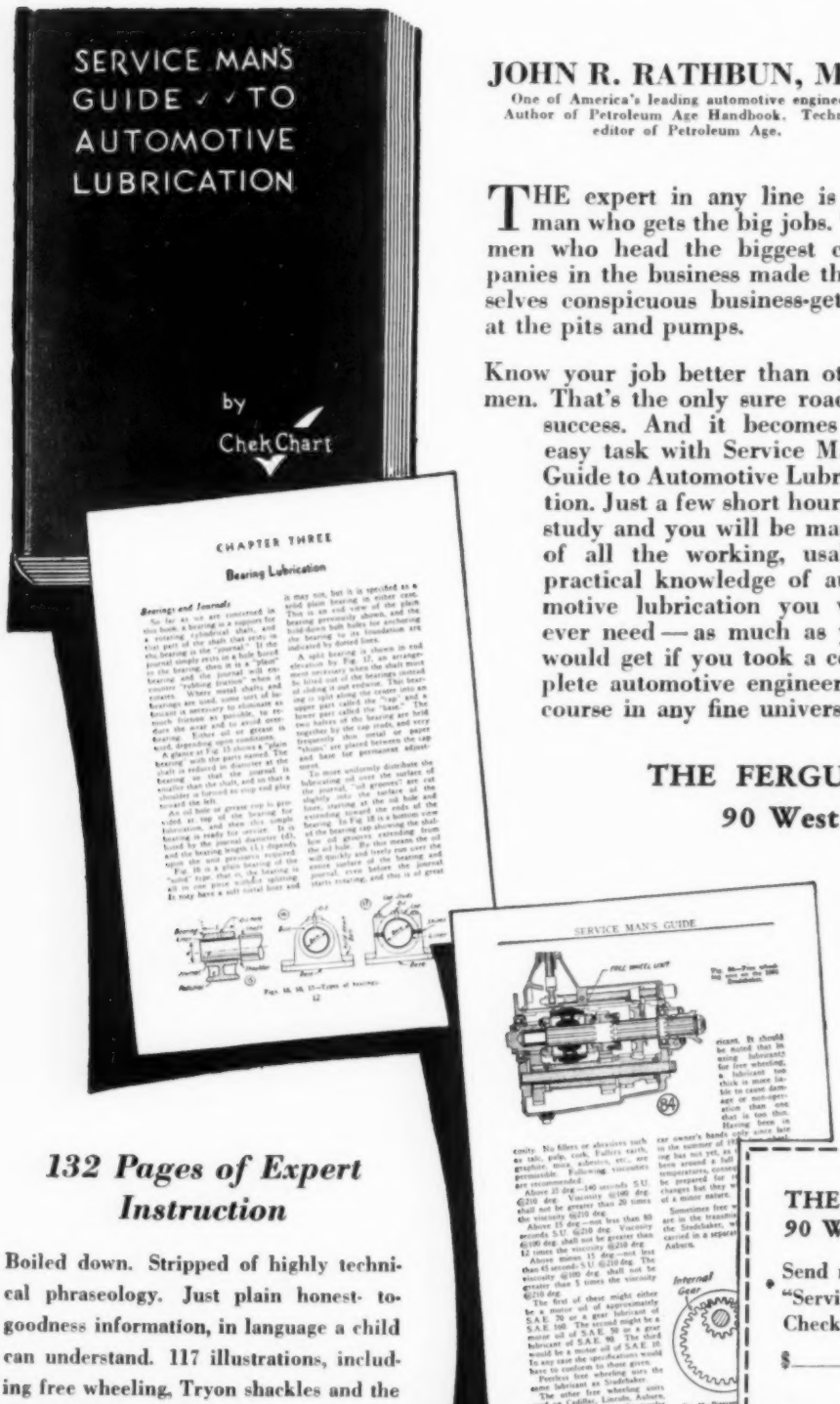

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Date Name_____

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Say "I saw it in FLEET OWNER"—It Helps!

TROUBLE SHOOTER

(You Ask 'Em — We Answer 'Em)

A department, devoted to correspondence from readers of FLEET OWNER. Any questions having to do with automotive service will be answered in this department. All properly signed inquiries will be replied to by mail and such of them as are believed to be of possible interest to other readers will be published in these columns.

What Does It Cost?

Question: We run a fleet of ten Autocar trucks. These trucks have no speedometers on them and we have never been able to check up accurately on the costs. You may have some dope on the subject. If you have, we should be very grateful for any information you can give us. We would like to know about what it costs to haul a ton of coal a mile—leaving out depreciation, repairs and drivers' wages.—H. C. M., Baltimore, Md.

Answer: It is possible for you to check up on the actual work done by your trucks by means of various types of recorders or odometers that are now on the market offered to operators. We are sending you a book that describes one of these. It is called *"Ten Ways of Getting More Work out of Trucks"*. We are also sending you a book entitled *"Making Coal Deliveries Profitable."* The latter contains much data that would apply to the operation of a coal fleet and gives some good dope on cost figuring.

With regard to how much it would cost to haul a ton of coal a mile, this is a problem which depends largely upon the locality you are in, the type of truck unit used, etc. It would also be governed by the amount of coal that is delivered in each unit and we are not in a position to go on record with any definite figures at this time. Any figure that we might give you could be "shot full of holes" by some fleet operator in some other section of the country.

We believe that the two books just sent to you, as mentioned above, will give you something substantial to base your future calculations on. Should other readers desire either or both of these books, the Editor will be glad to see that *free* copies are sent. Just use your letterhead, please, and ask for copies of *"Ten Ways of Getting More Work out of Trucks"* or *"Making Coal Deliveries Profitable."* We shall be pleased to send either, or both, without obligation of any kind.—(*Ed.*)

We're No Mind-Readers

Question: Please inform us if a Continental E4 engine can be put in a Federal truck without making any changes.—F. W., Brooklyn, N. Y.

Answer: It is not possible to answer this question because you do not state the model of the Federal truck into which you would like to place the engine. Neither did you state what size engine the truck formerly had and how it compares in size with the Continental E4.

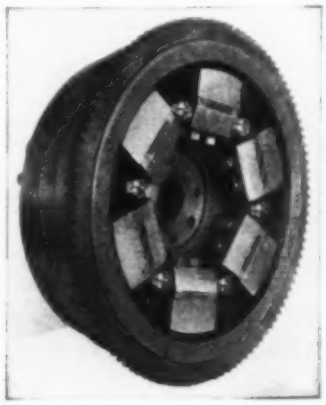
We would suggest the following, however: If this motor is of the same horse power, bore and stroke, etc., as the original engine—or if it is very nearly the same size in these requirements, you might measure it up and see how it compares in physical size with the old engine in the truck.

Changing engines is something that no one but a truck engineer can recommend and if you have the time, we would suggest that you write a letter to the truck manufacturer and outline your story to them, giving the model of the truck and also any other information which might serve to identify it.

About the Self-Operating Clutch

Question: Can you give us any dope on the new self-operating clutch about which I have read, I think, in your magazine? I do not refer to the vacuum controlled devices, such as are used on many of today's jobs, but I mean the centrifugal type that operates by itself.—J. L. D., Pittsfield, Mass.

Answer: We believe you are referring to the "Power-flo" self-operating clutch, a brief description and illustration of which is given here.



The action of this clutch is governed entirely by engine speed, through a mechanical adaptation of the centrifugal weight principle, the unit being self-contained and departing structurally hardly at all from standard clutch practice.

The features of the clutch which depart from standard clutch design reside in the fly-wheel assembly and consist of the six governor parts, a second (automatically operated) pressure plate and six counter-operating springs. The weights are "T" shaped, the large part of their weight being concentrated on the outer end of the "T." They are seated between the fly-wheel of the engine and the automatic plate, and revolve always at motor speed, as does the automatic plate.

While the engine is stopped, or is running at idling speed, the self-operating clutch is disengaged—that is, the clutch, plates are not in contact, and therefore none of the engine's power is being transmitted to the drive shaft.

However, when the throttle is opened and motor speed increases, the weights, responding to centrifugal force, begin to spread their heavy ends outward. As this action takes place, the other end of the "T" begins to exert a leverage upon the automatic plate, gradually and irresistibly forcing it to engage the driven disc between it and the standard, or positive pressure plate.

Rings for an Oil Pumper

Question: We have tried several makes of piston rings to stop oil pumping on a Model A Ford, where the pistons had .004 inches clearance, but without good results. Would appreciate your view of this difficulty, as we are sure this trouble has been widely experienced.—H. A. B., Atlanta, Ga.

Answer: There are, of course, many makes of piston rings on the market today and in almost all cases the manufacturers claim that their rings will take care of oil pumping conditions. It is not within our province to recommend any make, so that's out.

However, several fleet men and service station mechanics tell us that they are able to fit these slotted skirt alloy pistons comparatively tightly. In fact, some of them fit these pistons so that the skirt goes in with a push fit, and with a clearance at the top of about .012 to .016 inches.

We believe that you are familiar enough with the ring clearances, and know how to fit rings, so will not go into that here. Why not go to your local automotive jobber and see what his reaction is as to a good type of piston ring that will take care of oil pumpers? We are sure that he can recommend something, provided that your cylinder walls are in a condition that does not call for reboring or honing, in which event, it would be difficult to say that any piston ring could absolutely do a perfect job.

Valve Clearance on Reo

Question: We have a Reo 2-ton truck, with a T-Series motor in it, having F-head and timing gears. Please give us the exact intake valve clearance for timing this motor.—L. G., Liberty, Pa.

Answer: According to our records the Reo made a four and a six-cylinder engine of this type, which they called the T-Series. The valve tappet clearance at the intake and exhaust valves should be about .012 inches.

TROUBLE SHOOTERS' DEPARTMENT (*Continued*)

Why the Coils Burn Out

Question: I am in charge of a fleet of trucks, most of them being Whites 15B ¾-ton and Ford AA. On the Whites we very often have a breakdown of the ignition coil. The battery is good, terminals good and tight and as far as we can see, all other parts of the ignition system are in good shape. The coils are Leecc-Neville, which are supposed to be for truck purposes. Can you tell me as to what would be the cause?—T. L., Mt. Vernon, N. Y.

Answer: Offhand, we might guess that there is too large a gap somewhere in the high-tension circuit; either too much of a gap at the spark plug points, or a burned-out distributor cap, or one that is nearly burned out. There also might be a break in one of the high-tension wires that would not ordinarily cause the motor to miss, and thus remain unnoticed.

Whenever there is a large gap anywhere in the high-tension circuit, it causes the voltage to build up and this voltage finally feeds back and has a deteriorating effect on the coil.

We would suggest that you set the spark plug gaps a bit closer and thoroughly examine the rotor and distributor segments inside of the distributor cap. Check up on the spark plug wires and make sure that they are pushed all the way into the sockets on the distributor.

It would also be well to test the condenser and make sure that there are no loose connections between the generator and the battery. The latter, besides burning out lamp bulbs and distributor points might also burn out coils. If you are using any of the trick "intensifiers" now on the market, these might be a contributing cause, particularly if they are of the gap type.

It Knocks on a Turn

Question: In our fleet there is a 1930 Chevrolet coupe which has a very decided knock or rapping when making a right-hand turn at 25 or more miles per hour. If the curve is short, it will not start knocking until the car has straightened out, but it will invariably have this knock and it usually lasts from three to six seconds and quits right off. It seems to be at crankshaft speed and sounds very much like a rod knock. It will not occur on a left-hand turn, or under any other conditions.

The motor has been checked for loose bearings, loose flywheel and end-play. The valves have been ground and a new set of plugs installed, and so far no one has been able to locate the trouble. Would certainly appreciate any information you might be able to give.—F. E. P., Miami, Fla.

Answer: We note that you have checked many things and are wondering if you checked up on the front and rear engine supports where the engine is mounted to the frame of the car? We believe that the left-hand engine support might be loose; or perhaps the front support.

Another possibility, which we have seen somewhere, is that the oil might be diverted from the oil pump when making a turn and the bearings could be temporarily "dry" of oil, which would cause some kind of a knocking noise. This could be easily determined by running the engine with the car first tilted to the left and then to the right. If the knock is caused by this condition (although we don't think so) you might be able to put some sort of a baffle around the oil pump to keep the oil in place while the engine is tilted.

We are rather inclined to think that your trouble is caused by a loose engine support, as stated previously.

Charging Truck Batteries at Curb

THE fleet of electric trucks of the *Chicago Times* makes six trips a day delivering papers through the downtown Chicago district, making a daily average of around 16 miles each. The batteries are charged at the curb between trips, the charging periods varying from 20 minutes to 1½ hours. The power is derived from a DC 117-volt main.

Each time the driver returns to the plant, he backs up to the curb and immediately puts in the charging plug. When the charging plug is in, the battery starts charging and a light flashes on behind a number in the basement window corresponding to the number of the charging circuit indicating that the circuit is completed.

The meters are equipped with break contacts at zero so that should the charge be completed before the driver is ready to start on his next trip, the circuit is automatically broken. No other attention is given the charging except each Friday night the trucks are left at the curb to make sure the battery is fully charged. Minimum charging current rate is obtained, and there is also a saving of garage labor.—*Exide Ironclad Topics.*

Straighten Axles Cold

BENT car axles, resulting from accidents always should be straightened *cold!*

This advice to service station managers comes from D. S. Devor, vice-president in charge of production of The Timken-Detroit Axle Company, the largest manufacturers of car axles in the country.

"Axles are made from special processed alloy steel scientifically heat-treated and therefore cannot be reheated without destroying the original metal character of the unit," Mr. Devor said. "Laboratory tests conducted by our engineers show hot straightening reduces the strength of the metal in axles 40 to 60 per cent, which is ten times the loss resulting from cold straightening. A bent axle never should be heated to straighten, as it creates a serious hazard."

Old Truck Won't Pull

Question: We have a G. M. C. truck in the shop, having rebored the motor, ground the valves and replaced spark plugs and ignition cable. This motor has not got any power. It will not pull itself up a small hill in high with an empty truck. It has a ZU4 magneto with impulse starter. We would appreciate any help that you can give and would like to get the right valve timing. It is a Continental C2 motor with a bore of 4-⅛ inches. Please let us hear from you at once as we have to get the truck out on the job.—G. T., Oxford, Pa.

Answer: We are answering you by special delivery mail. The valve timing is as follows: Intake valve opens ten degrees (on flywheel) after top center. Valve tappet clearance can be set at about ten thousandths. The ignition can be timed to occur at top center with the spark fully retarded; this can be done by seeing that the breaker points break at this point.

We are wondering whether or not your reboring job has turned out right? Check the compression with a hand crank, and make sure that the engine has been allowed to run-in sufficiently, so that it is quite limber and can be turned over easily.

If all these are o. k. and you take care of the valves and spark as previously outlined we see why you should have no further trouble, provided the engine gets the right mixture from a proper carburetor adjustment.

Watch for the "Hypoid" Gears

Question: What difference, if any, is there in the gear ratio of Packard Models 236 and 343 and can we interchange them? I understand the 343 is of the semi-worm type.—F. A., Ponca City, Okla.

Answer: We don't know what you mean by "semi-worm" type of gears, but presume you are referring to the "Hypoid" gears, which some Packards used. If one of these models uses the Hypoid type and the other uses the regular spiral bevel gears, we would say that they are *not* interchangeable, because the mounting positions would be different. The Hypoid pinion, you will find, is to be mounted below the center of the ring gear, while the straight spiral bevel is mounted at the center.

The best way to make sure is to compare the gears themselves, provided you have both. If the gear ratio were not exactly the same you could take a chance on interchanging the gears, provided they fit otherwise, and that they are both of the same spiral-bevel type. This would do in a pinch, although it would be best to get the exact ratio as originally used.

Something for the "Cops"

AIR compressors are now being used to increase the efficiency of "Silent Policemen". In Ottawa, Canada, a DeVilbiss NC Air Compressor is being operated in conjunction with a "Stop" and "Go" traffic light on one of the city's busiest corners.

When the light is about to change, the air from the compressor blows a police whistle. Since this can be heard a block away, it is very effective in calling the attention of motorists to the traffic signals.

Complete details on this type of outfit can be secured on application to The DeVilbiss Company, Toledo, Ohio. You'll be sure to mention FLEET OWNER won't you?

READER SAY-SO

(Picked at Random from The Editor's Mail-Bag)

"We Like the Change in Size"

"WE do find the publication FLEET OWNER of interest and value to us, as there are many helpful suggestions in the various articles that we read therein from time to time. We like the change you have made in the size of this publication. We operate a fleet of 28 trucks." —*A. C. Caldwell, The Hale-Halsell Co., McAlester, Okla.*

"Our Garage Supts. Subscribe"

"WE think you have a very nice publication and it is being subscribed to by our various plants for the benefit of our garage superintendents. We operate 368 vehicles located in Brooklyn, Newark, Chicago and Detroit.

"I shall in the future be glad to outline our system of maintenance and operations which I think is very accurate and also devoid of many complicated forms."—*Stanleigh Megargee, Supervisor of Auto Equipment, Pie Bakeries, Inc., Newark, N. J.*

Who Else Wants a Sample?

"YOUR article in the May 1932 issue about "Preventing Cooling System Corrosion" is of interest to us, as we have had several experiences along that line that caused us considerable trouble and expense. We would appreciate receiving a sample can of Rustone as right now we have a radiator that needs cleaning and we would like to try it in this one after it is cleaned."—*F. B. Close, Altoona Drive Yourself Co., Altoona, Pa.*

(*Editor's Note: There still is a large supply of these samples available to fleet operators without obligation. Write to the Editor; first come, first served.*)

"Excellent and Timely"

"IN the May issue of FLEET OWNER I have read the article by Mr. Will Damman and I consider it excellent and timely. May I impose on your good nature to send me a copy of the Wheel and Axle Manual? Thanking you in advance, and with high commendation for your publication, the receipt of which I look forward with interest each month."—*J. O. Schwank, Supt., N. Y. Board of Fire Underwriters, New York City.*

You're Quite Welcome!

"THANK you very much for your splendid magazine FLEET OWNER. We operate a fleet of 40 busses."—*R. B. Maxwell, Branch Manager, Peerless Stages, Inc., San Jose, Calif.*

Bus Operator Enjoys It

"WE enjoy your publication FLEET OWNER and wish to thank you for the service. Our fleet consists of 80 motor busses."—*W. S. Penfield, General Manager, East Bay Motor Coach Lines, Ltd., Oakland, Calif.*

He's Interested—We're Satisfied

"IN reading the FLEET OWNER as published by you each month, I find it contains many good things and I am very much interested to read this magazine. I am in charge of a fleet of trucks in the bakery business."—*Thos. Lairino, Garage Supt., Continental Baking Co., Mt. Vernon, N. Y.*

We Are "Kept on File"

"YOUR publication FLEET OWNER is received here every month. Copies are not destroyed, but are kept on file. We operate a fleet of 28 gasoline trucks and 20 passenger cars."—*H. T. McInnes, Garage Foreman, Southern California Edison Company, Pomona, Calif.*

"Very Interesting"

"PLEASE send me a 'Piston Chart, Tools that Do the Job Right and the Wheel and Axle Manual.' Your monthly issues are very interesting."—*H. Rohne, Foreman, Nafziger Baking Co., St. Louis, Mo.*

A Bouquet from Oklahoma

"I CONSIDER your publication FLEET OWNER of considerable value to me in my work and have appreciated the magazine very much. My work keeps me away from the office a good part of the time and would like to have it sent to my home address."—*Howard A. Evans, Asst. Supt. Motor Transportation, Phillips Petroleum Co., Bartlesville, Okla.*

"A Very Fine Book"

"I HAVE been receiving FLEET OWNER each month and consider this a very fine book and full of useful information. Thanks for the many copies you have sent."—*F. McDonald, Engineer, Globe Grain & Milling Co., San Francisco, Calif., operating a fleet of 12 trucks and 25 passenger cars.*

Where Are the Southerners?

"I AM a constant reader of your very valuable publication FLEET OWNER and I must say I have gathered some very valuable information from it. I am sorry to note, however, that few of the answers to the Question-of-the-Month Club come from the South. There's room for improvement there. We operate 25 trucks and 60 passenger cars."—*H. A. Boone, Garage Foreman, Southern Bell Telephone & Tel. Co., Atlanta, Ga.*

"Glad to Receive It"

"I AM glad to receive the FLEET OWNER every month as I feel we get some very interesting data out of it. Enclosed please find questionnaire which you forwarded to me. I have filled out same for your information."—*F. F. Sprengard, Mgr. Automotive Dept., Standard Oil Company of Ohio, Cincinnati, Ohio.*

Short and Sweet

"I WOULD be glad to receive a sample of Rustone. I like each copy of FLEET OWNER a little better than the last one."—*Howard Hudson, 2009 Broadway, Schenectady, N. Y.*

Finds First Copy Interesting

"RECEIVED my first copy of FLEET OWNER today and find that it contains some very interesting articles."—*C. A. Perdue, Mgr. Auto. Equip., United Fuel Gas Co., Charleston, W. Va.*

My Experience with Gas-Gauges

"IN answer to A. E. D. of Welsh, W. Va., whose inquiry appeared in the April issue, I would say, from twenty-one years of experience, that I have found only one positive and accurate gasoline gauge, and that is a stick.

"We had the same trouble with several of our Federal trucks, that A. E. D. is experiencing. To overcome the waste of gasoline and expense of new gauges, we removed the tanks, cut off goosenecks at the tank and soldered a plate over the hole in the side of the tank. We then cut the neck off about two inches from the cap and soldered it on top of the tank at the end.

"When we replaced the tanks we made brackets to suit and moved the tank over so that the filler hole was just outside the body line, but not beyond the fender. The result? No tanks run over and no gauges to buy. We trust this information will be helpful to other readers of FLEET OWNER."—*Albert W. Sharp, Garage Foreman, Suburban Laundry, Philadelphia, Pa.*

WHAT DO YOU READ?

HERE'S a hand-picked assortment of literature that is offered to you entirely without obligation.

We've even made it easy for you to get it. Fill in the coupon below, mail to the Editor, and let us do the work. We'll ask them to send it at once and not to bother you with salesmen, either.

1. How to Cut Oil Costs. Literature that tells you how you can save real money by reclaiming crankcase drainage. Tells how much it costs per gallon to reclaim your oil; what the machine costs; how it works. Also tells what other operators are doing along these lines.

2. The International Trail. A distinctively well-written and interesting monthly magazine issued by a leading truck maker. Besides listing new models, it contains many well illustrated stories that relate the experiences of other operators with trucks, in many different lines of business.

3. The Inside Story of Ethyl Gasoline. A well gotten up booklet that answers any question you might have in mind about Ethyl Gasoline. It's written in plain English, with all the high-hat, engineering terms left out, and, believe us, it's mighty interesting.

4. New Brakes for Old Trailers. A set of data sheets and engineering bulletins describing power brakes and trailer axles and telling how you can comply with the law regarding brakes for trailers, without scrapping your present equipment. More than five large companies had a hand in preparing this, so it must be good.

5. The Four Airmen. Meaning four air appliances for better tire service. This literature describes a four-point air service that insures proper inflation, instant reading of pressures and positive seal of air in tires. Tells how to get more mileage out of your tires, too.

6. Sponge-Rubber Seats for Your Drivers. This literature illustrates and describes a new type of truck or bus driver's seat that can't wear out, is always fresh and resilient and gives the driver a sense of security and firmness in driving. We'll say it's worth investigating.

7. Be a Transportation Expert. Learn more about tires for all types of heavy-duty vehicles. Get this especially prepared booklet of bus and truck tire facts, issued by one of America's leading tire manufacturers. It also contains the latest dope on balloon tires for trucks and busses; also puncture-proof tubes.

8. Modern Trailers and Semi-Trailers. This set of literature covering trailers for all types of hauling needs is offered by one of our largest trailer manufacturers. It illustrates and describes such features as fifth wheels, rounded front ends, automatic couplers, brakes and axles. Well worth asking for.

9. Save Money on Ignition Cables. This literature describes a new tool for attaching terminals to high tension wiring, giving a factory-finished job, with an inexpensive hand tool. By carrying a few spools of wire and a small box of terminals, you can become a cable "expert" with very little practice. There's a new distributor terminal shown in this literature, too.

10. Get a Sample of This. A generous-sized piece of good sheet packing that you can use on your next job will be sent. All you have to do is enter "No. 10" on the bottom of this blank and mail to the Editor. It's free, of course.

11. No More Cocked Valve Springs. This literature describes a new idea in valve spring tension equalizers that will put your valve troubles to an end, unless we've missed our guess. It also gives the dope on flat-seat valves, about which everbody is talking.

12. Does the Pump Leak? A new type of water-pump that is absolutely "Pack-Less" and can be installed on any of the popular makes of cars and trucks. This is something that we've been looking for since "they fought with spears." A Cleveland firm announces it, and their literature is offered free.

13. Guaranteed Spark Plug. "Thirteen" might be an unlucky number, but if you are having spark plug troubles, why not try to change your luck? The man who issues this plug literature (and sells you the plugs) will let you be the judge as to whether or not he has a better plug. Of course we'll see that you get the literature, if you want it.

14. Stops Like Lightning. We don't know how fast that is, but imagine it must be p.d.q. That's how fast your trailers, heavy trucks or busses will stop, says the maker, if you install his new electrically-controlled brake booster. Ask him to prove it by sending literature, without obligating you.

15. Pay Cash and Pay Less. That's good advice, provided you can scrape up enough of the necessary wherewithal. At any rate here's a truck manufacturer who offers a liberal discount to fleet buyers and invites you to write for his proposition. We don't know anything more about it, but will be glad to dare him to prove it to you.

16. More Saving on Wires. We've told you about saving money by making ignition cable outfits for your engines (see No. 9) but we forgot to mention that you should use quality cables. We'll let this manufacturer do it, in his especially prepared Ignition Cable Bulletins describing a better grade of wire for oil splashers and other tough locations. Get them—they're free.

17. Build Your Own Bodies? If you do, you'll surely want literature and samples of new plywood with metal facing, for panels and other parts of the bodies. We've got dope sheets from two good manufacturers on our list; all you must do is mention "No. 17" and we'll bet on the nearest one to reach you first.

18. Wheel Alignment Specifications. We've been preaching wheel alignment for a long time, but now you can know that your wheels, axles and related parts are in their proper positions by referring to this "Wheel and Axle Manual." It gives the authentic factory specifications for toe-in, caster, camber, n'everything. Besides, it shows how your mechanics can become experts in this line. If you don't like it, send it back; but we're sure you'll keep it. Anyway, like everything else on this page—it's free.

19. "Load 'Em Safely, Legally and Profitably" is the title of an interesting broadside that shows how double payloads pay dividends—how they can be handled for a smaller initial investment and at reduced operating costs. In other words, boys, its dope on a brand new six-wheeler or "third axle" that ought to be of interest. Just ask for No. 19.

20. "Save $10 to $15 Per Block by using our cylinder reconditioning equipment" is the advice of one of our good manufacturers. We shall be glad to ask them to prove it to you by sending literature, minus salesmen. No. 20 does the trick.

21. Guaranteed Vales may not be the newest thing in replacement parts, but every fleet shop ought to have at least one or two valve catalogs handy. This one will be placed in your hands promptly and without obligation and since it covers trucks, busses, tractors, etc., it ought to be worth keeping. 21 is the number, please.

22. Studebaker Trucks, which you have seen advertised in this publication, offers you a set of their latest literature and folders covering their new low-priced models. Their 1½-tonner is claimed to be an ever-so-powerful truck. Let them prove it to you by asking for No. 22.

23. Truck Tire Handbook is but one of the new pieces of literature offered by a leading tire manufacturer. We know that you've seen plenty of these, but if you haven't seen the one issued by Firestone, just fill in No. 23 and we'll do the rest.

24. Something for Nothing is usually worth what it costs, but don't think that there isn't an exception to this rule once in a while, anyway. Here's a good brother that offers you a liberal-sized sample tube of gasket cement. If you like it, use it up and buy the next lot from your jobber. The sample's free and we're here to see that you get it. Ask for No. 24.

25. Cheating Cheaters Cheated. Not the title of a new movie, but a modern method of governing the speed of your vehicles without having as much as your hand on the throttle. The secret's out—it's the cheat-proof governor that they're talking about. Let them give you the dope by sending literature, sans obligation, sans charges and sans salesmen. Number 25, please.

26. Getting More Work Out of Motor Trucks. Not by psychological sales talks to your drivers, not by soft-soaping or slave-driving them, but by intelligently keeping a system of recordings of the operation of each and every vehicle in the fleet. If your drivers have lunch-time sweethearts, you'll know it, too. Number twenty-six brings the "here's how" without obligation.

27. Brake Service Bulletins. A prominent brake lining maker has prepared a set of bulletins covering the detailed service operations on all types of brakes for cars, trucks and busses. He'll be glad to send you a set free of charge, even if you are not at present using his brake lining. Ask for No. 27. Don't send any money.

28. Pin Fitting Made Easy. Here's a new booklet that is claimed to take the grief out of piston-pin fitting. It describes a handy gauge that determines clearances between pin and hole and eliminates guess work. It can be used on even the largest of pin diameters.

29. Another Free Sample. This time it's valve grinding compound. There's no secret about it—if you haven't had an opportunity of trying Pep Grinding Compound, the makers are anxious to have you do so without obligating you. Just mention No. 29.

30. Cooling Corrosion Conquered. The makers of Eveready Rustone are anxious to have every fleet maintenance man try a full-sized sample of their product. It's claimed to be "a true rust and corrosion inhibitor" and they'll send it free. If you would like to prove to yourself the inhibitions that this inhibitor will inhibit, ask for No. 30. In all seriousness, this is something to be placed in the radiator to prevent internal rust and corrosion. We've tried it, have you?

31. Brake Technology. Don't let the big word scare you. This is a pocket-sized book containing questions and answers on such subjects as asbestos, co-efficient of friction, self-energization, pedal pressures, etc. It also gives formulae for determining stopping distances and other figures and describes the various types of braking systems now in use. Troubles, Causes and Remedies are also given. Written in language that even your Editor can understand.

32. Condensed Catalog on spray-painting equipment, air compressors and other air specialty lines, featuring newly lowered prices that recently became effective. If you are not familiar with DeVilbiss products this catalog will acquaint you.

33. Stewart News & Views. This is a monthly publication issued by this Buffalonian truck maker to its dealer organization, we presume. If you would like to be put on their mailing list ask them, or us. If the latter, just mention No. 33.

34. The Haskel-Lite. Another monthly publication. You should be able to easily guess what it's all about. The makers of Haskelite, PlyWood and Ply-Metl issue it and we'll gladly tell them to put you on their mailing list if desired. No. 34 does the trick this time.

35. Speed Wagon Literature. It's not hard to guess that this is some interesting truck broadsides issued by Reo. We're doing nothing but reminding you. Choose literature on any make of truck, and we'll see that you get it. Number 35 is Reo's.

36. Hang It Up! A leading piston-ring maker offers a chart of decimal equivalents that also gives some valuable dope on how to fit pistons, rings and pins. There's no more guess work as to how much clearance is required if you are equipped with a chart of this kind. Then, too, it's free.

37. Replacement Radiators. Warmer weather brings with it many radiator headaches. Here's a catalog on replacement radiator cores especially offered to fleet owners. It gives some hot information on cool radiators and is offered free. Even the largest types are covered in this literature.

38. Armorply Price List. No doubt you've an idea that this is a new plywood that is referred to. You're right, but it's got a metal facing, too. A new price list, recently issued, features substantial reductions. No. 38 brings it free.

39. Brake Drum Development. Yes Sir! This one is claimed to be the most important since the introduction of 4-wheel brakes. It tells in simple language just what is meant by "Centrifuse"—a new type of drum that they say is self-truing, noiseless and has ever so many advantages. You can't prove it by us, but we're glad to help you get a copy of the new Brake Drum Handbook that gives the dope. Ask for No. 39.

40. Chrome-Plated Piston Pins. Something that is claimed to never need replacing during the entire life of the engine. If it sounds as interesting to you as it does to us, you are invited to be the recipient of new literature and catalogs on the subject. There are many advantages in chromium-plating on pins. Number 40 brings the details.

41. Diesel Engines. An interesting broadside describes a stock model Diesel engine for trucks and busses. It gives all dimensions for mounting and this engine will soon be (or now is) in production on a quantity basis. Since everyone seems to be interested in Diesel developments in this field, we expect that our service in providing this information will be valuable.

42. Service Station Equipment. This new catalog illustrates, describes and prices such items as gasoline dispensing systems, metering units, oil equipment, grease buckets, tire inflators, air compressors, etc. An elaborate piece of work that will enhance the attractiveness of any catalog collection.

43. Spark Plug Chart. Here's a chart of spark plug recommendations showing the correct type of plug to use for all installations including trucks, busses, taxicabs, passenger cars, motorcycles, tractors, marine engines, etc. Hang it on your wall, or paste it in your portfolio and then go to sleep, conscious of the fact that you are using the right type of plug. Remember, we've said nothing of the make of plug. That's entirely up to your choice from experience.

44. Smooth-On Handbook. Here's a welcome addition to any library of automotive literature. It illustrates and describes the various uses of the popular iron-cement for repairing cracked blocks, radiators, manifolds, stripped threads and many other jobs about the garage and shop. An unusually complete edition is now available.

45. Modern Cleaning Methods. Do you use gasoline or kerosene for cleaning parts, walls and floors? If you do, you're not quite in line with modern practice and are exposing yourself to a fire hazard as well. We'll let this interesting illustrated booklet prove it to you and show how to speed up service operations in the shop. Ask for No. 45.

The Editor, ... 1932
FLEET OWNER,
90 West St., New York, N. Y.

Kindly send me without obligation, the following free books mentioned in the ..... issue.

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Firm Name .....

Address .....

City and State .....

Your Name ..... Position .....

How We Figure Our Cost Data

(*Continued from page 7*)

addition as outlined in the above example, Table 3 as shown on page 7 has been prepared. Table 3 shows the cost per mile of operation of truck and trailer of various capacity for various distances. For any given number of miles traveled, add the truck cost per mile to the trailer cost per mile to get the cost per mile of a truck and trailer movement.

To still further simplify the cost determination, Table 4 has been prepared. Table 4 (also on this page) shows cost per trip of truck and trailer operation of various capacity for various distances.

Interested fleet operators can prepare a chart that would show graphically the data contained in Table 3. The curves produced would show that the costs per mile decrease as the distance traveled increases. Cost per mile for the various equipment for any distance up to 250 miles can be read to the third decimal point from these curves. (In this connection, the article on page 8 of our April issue entitled "It's Here—The Cost Yardstick" will be found of interest, inasmuch as it does contain a graph of this kind, showing how the cost per mile decreases as the daily mileage increases.—*Editor.*)

Keeping "Flying Red Fleet" Flying

(*Continued from page 12*)

sign eliminates crowding. That the excellent maintenance facilities provided for this fleet are in no small measure responsible for the excellent service given, it goes without saying.

No other city in the world is known to have a deluxe bus system comparable to the Detroit red buses or one demanding such strenuous service of the vehicles. Pavements on some of the streets over which the buses are routed are extremely rough, subjecting bodies and chassis to terrific shocks and jolts.

One of the many interesting phases of this unique transportation operation is the fact that when pavements are the iciest, accidents *decrease* rather than increase. At such times, records disclose, drivers of other vehicles are responsible for two-thirds of the accidents in which the red buses are involved.

More Tire Mileage? Here's How

(*Continued from page 16*)

tires with a resulting increase in miles.

Without records of tire mileage, improvement may not be recognized. In addition, the study of individual tire mileages often is the means of locating trouble that is reducing the average. Therefore, the maintenance of a simple and accurate tire mileage record system is highly advisable. Such a system should tell:

1. *What mileage each tire gives.*
2. *What tire costs are.*
3. *Comparative figures for various makes, sizes and types of tires.*
4. *Comparative tire costs on various vehicles.*
5. *Location and degree of bad operating conditions which adversely affect tire mileage.*
6. *Actual inventory and location of all tires in the possession of the company both in and out of service.*

In this article only proven facts and practices have been mentioned. Many of the suggestions may appear simple and self evident, yet it is not always the hard and complex that accomplishes the best results. I hope that some of these suggestions will help you reduce your tire costs.

Editor's Note: Mr. Sprowls, who gives you this timely tire maintenance advice, is Manager of the Transportation Department of the Goodyear Tire & Rubber Co.

Servicing New Bendix Brakes

(*Continued from page 24*)

justing screw; (3) secondary brake shoe; (4) primary brake shoe; (5) anchor pin; (6) top shoe return spring; (7) cable return spring; (8) backing plate; (9) adjusting screw spring; (10) bottom shoe return spring; (11) operating lever anti-rattle spring; (12) operating lever; (13) brake shoe hold-down spring; (14) adjusting screw pivot nut.

Fig. 4—Sliding adjustment type anchor.

Fig. 5—Brake shoe stop.

Fig. 6—Eccentric type anchor.

Should any further questions arise on servicing this newest type of Bendix brakes, the Editor will be glad to provide the desired information. When writing, address the Trouble Shooters' Department and your request will receive prompt attention. We believe, however, that the foregoing factory-prepared article will be fully sufficient.

New Ford Specifications

(*Continued from page 33*)

the engine. The four-cylinder job now has a fuel pump, larger crankshaft and increased horsepower resulting from manifold changes, carburetion and speeding up of the r. p. m. Fuel tank on both Four and Eight is mounted at the rear.

For additional data on the Ford Eight, the reader is referred to page 45 of the April FLEET OWNER, where our first story appeared. The major specifications of the new Ford four-cylinder trucks are given in tabulated form on page 33 of this issue.

And that's about all, until some of the cars are in use for a while and service problems begin to present themselves. It is also understood that the specifications furnished in this article are subject to change without notice, so if anything is different on the cars that you may get, any changes will have been due to further developments in production.

U. P. S. "Breakfast Club" Meetings

A UNIQUE plan in connection with the training of delivery drivers has been originated by the United Parcel Service, an organization which delivers for department stores and retail specialty shops in New York and vicinity.

Every Monday morning at seven o'clock the company holds what is called a Breakfast Club meeting for the employees of one of its several stations.

The purpose of the Breakfast Club is two-fold—first, to afford a medium of social contact between the executives of the company and the men in the ranks, and secondly, to develop leadership qualities.

At these meetings, lasting a little over an hour, there is singing and impromptu entertainment features, balanced with a few talks by officials of the company and by the drivers themselves, these talks usually being on subjects not pertaining to the delivery business but of a general nature.

There is usually some contest to stimulate added interest and rivalry between groups. For example, a slogan contest has resulted in each station adopting a slogan symbolizing the spirit of its group. The men were encouraged through an employee publication to originate slogans and announce them at their following Breakfast Club meeting. A committee selected from the floor, picked the best slogan, the originator of which received a cash prize.

Another feature of the meetings is the presentation of a wallet containing a safety certificate for drivers who have completed two years without an accident.

for ROAD *and* SHOP

"Check and Double Check"

A NEW "Dublchek" tire valve cap is announced by A. Schrader's Son, Inc., Brooklyn, N. Y.

"Dublchek" is an air-tight dust cap that is permanently attached (with pliers) to the valve stem of any tire. It provides an extra check on inflation pressure because it contains a second "valve core" within itself, and excludes dust and dirt as well.

When "Dublchek" is attached, it is not necessary to remove it and tire inflation can be done in the conventional manner.

Besides the above features, the makers point out that "Dublchek" saves time in inflating tires, as it is not necessary to remove anything. Just apply the air chuck and put in the desired amount of air. Gauging is done in the usual way.

An interesting folder has been prepared that outlines, much more thoroughly than we can do it here, all the features of this new device. For free copy write to A. Schrader's Son, Inc., 470 Vanderbilt Ave., Brooklyn, N. Y.

Raybestos F-W-Heavy-Duty Lining

THE newest product of Raybestos is a heavy-duty brake lining especially designed for commercial vehicles.

In its manufacture, according to the makers, asbestos metallic yarn is combined with plastic metal wire and woven on heavy-duty looms. The fabricated product is then saturated and heat-treated, after which it is pressed with great force that considerably reduces its thickness to finished size. The tremendous pressure used, it is declared, results in a very dense structure.

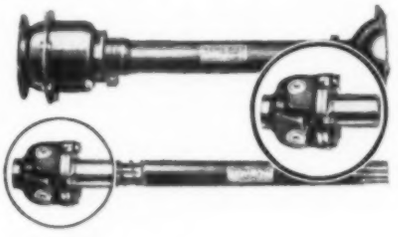
The lining is designated as Raybestos Silver-Edge, Heavy-Duty, F-W Brake Lining, and is claimed to have a high coefficient of friction; also that it can be used on steel or cast-iron drums without scoring. It is, of course, flexible and comes in rolls.

For further details address The Raybestos Division of Raybestos-Manhattan, Inc., Bridgeport, Conn. You'll mention FLEET OWNER, won't you?

Drive Assembly for AA Fords

A NEW assembly consisting of a front universal joint, a *tubular* drive shaft and a housing, for a replacement on Model AA Ford trucks, is announced by Almetal Universal Joint Company, 1553 E. 55th St., Cleveland, Ohio.

The makers point out that their assembly can be installed without any drilling, cutting, welding or machine work and that the installation time is the same as for the regular gear coupling. The unit is designed to fit all Ford AA trucks built after August 1, 1929.



An interesting descriptive folder; also a catalog on a complete line of replacement universal joints for Ford and Chevrolet cars and trucks, are offered free. When writing for same, please address the Company mentioned above and we'll appreciate it if you will say you saw it in FLEET OWNER.

New Line of Cylinder Sleeves

McQUAY-NORRIS has just announced a complete line of wet and dry cylinder sleeves and cylinder sleeve assemblies. This addition to the existing lines of piston rings, pistons, pins, valves, bearings, bolts and bushings, is in accord with the McQuay-Norris policy of manufacturing a complete line.

McQuay-Norris dry cylinder sleeves will be available for cars in which the cylinder blocks are badly worn or otherwise rendered unfit for further reconditioning.

McQuay-Norris wet cylinder sleeves are available for tractors which use this type of sleeve as standard equipment. Wet sleeves and wet sleeve assemblies, including sleeves, pistons, pins, rings and locking devices, as well as rubber packing rings, all completely assembled in one package, are included in the line.

In addition to the rubber packing rings which are included with each wet sleeve assembly, these rings may be purchased separately. Asbestos packing rings which are used in some tractors are not included with the wet sleeve assembly because they are not usually replaced but are available in the McQuay-Norris line separately.

Catalog sheets are now available. For details address McQuay-Norris Mfg. Co., St. Louis, Mo. You'll mention FLEET OWNER, won't you?

Carburetor Gasket Board

THE Vellumoid Company, Worcester, Mass., announces an attractive display board which will be of great convenience to fleet buyers, service stations and dealers, in the selection of the carburetor and outlet gaskets so frequently in demand. The gaskets are mounted on the board in their original cartons, so that they can be identified readily, and kept in orderly, useable condition.

Wohlert Gear Heater

THE Wohlert gear heater, manufactured by Bates-Wohlert Co., Lansing, Michigan, and illustrated here, is a simple, durable, efficient and trouble-free piece of equipment offered by this manufacturer, along with the popular line of Bates flywheel ring gears.

The gear heater simplifies the job of pre-heating flywheel ring gears prior to shrinking on the flywheel. The makers claim that it is fast, lights easily and burns a minimum amount of gas.

A new catalog has recently been issued by this company, that fully describes their line. Interested readers can get free copies on request by writing to the Company or the Editor.

NEW STUFF *for* ROAD *and* SHOP (*Continued*)

Eco "GYRO" Air Compressors

A LINE of Eco air compressors of the upright type has recently been announced, bearing the designation "GYRO" type.

The compressing unit is of the two-cylinder, opposed type, equipped with helical gears, Timken bearings and ball-and-socket drive, all running in an oil bath.

Outstanding features as announced by the maker include: fewer functional parts; 25 per cent less weight; 50 per cent less floor space; continuous piston motion; centrifugal force-feed lubrication; increased mechanical and volumetric efficiency; and two-cylinder balanced performance.

Since there are no connecting rods, rod bearings or piston pins, literature on this new type of compressor should be of general interest. For full details and prices address: Service Station Equipment Co., Conshohocken, Pa. You'll mention this publication, won't you?

New Brake Blocks Developed

TWO new types of brake blocks are announced by Durwyllan Company, Paterson, N. J., makers of Alltraffic woven and moulded lining.

One type of brake block called "Triplewear" is compounded of heat resisting materials under great pressure which prevents its being further compressed in service, the announcement states. This type is illustrated. In addition the makers declare that this new block is particularly resistant to heat and drum scoring; that the friction is tempered to eliminate "fading out" and that special reenforcement in construction assures a uniform and constant braking surface.

In addition to this composition block, a woven compressed brake block is also announced under the name, "Arcform." This block is claimed to be particularly adaptable where sand and grit conditions have to be overcome.

Further information may be secured from the Durwyllan Company, Paterson, N. J. You'll mention this publication, won't you?

Auto Lamp Prices Reduced

PRICE reductions averaging approximately 20 per cent on automobile lamps manufactured by the General Electric Company were announced recently by Gerard Swope, president of the company. The types of lamps affected comprise 80 per cent of the company's automobile lamp business.

The popular double filament 32-candlepower head-light lamp has been reduced more than 30 per cent, from 35 cents to 24 cents. Side and rear lamps have also been reduced and will now sell for ten cents. This marks another in the long series of reductions in the prices in incandescent lamps which have been put in effect since 1920. The average price of these lamps is now down 59 per cent from their 1920 prices.

Detroit Pistons and Pins

A SPECIAL piston and pin service is offered to Fleet Owners by Detroit Auto Piston Co., 1139 W. Baltimore Ave., Detroit, Mich.

This company manufactures a complete line of pistons and pins that duplicate original equipment, but also makes a specialty of supplying fleet operators with pistons grooved to meet individual requirements.

Warehouse stocks are maintained at principal cities, the Company announces, from which orders can be quickly filled. Cast iron, semi-steel and aluminum alloy pistons of all types can be supplied.

When writing, please mention FLEET OWNER and state your individual requirements. The Company will be glad to quote you without obligation of any kind. Their catalog is offered free. The Editor will get one for you, if you prefer.

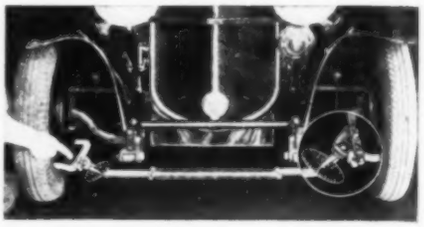
Retainer Service Board

THE National Motor Bearing Co. of San Francisco, manufacturers of National Oil and Grease Retainers, announce a new National Retainer Service Board Assortment of 38 pairs of most-used retainers. These retainers are mounted on 38 hooks on a 22" x 38", 5-ply laminated board.

Retainers are all carefully-selected numbers for popular makes of cars. 2 of each number, covering rear axles (inner and outer) and front wheels only. Retainer numbers are printed on the board to show identification and location of each set.

National oil and grease retainers are duplicates of car factory equipment. The Company maintains warehouses in San Francisco, Chicago, New York City, and Los Angeles. The line is sold thru jobbers.

New Bear Wheel Aligner

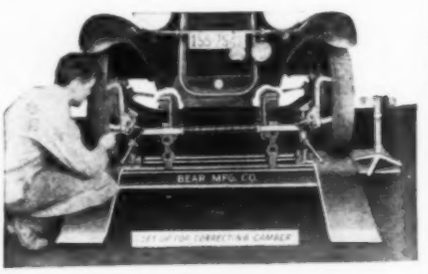


ONE of the features of the improved Bear Wheel Aligner is its new dial, graduated in both degrees and inches, to take care of all measurements to a fraction of a degree or inch, thus permitting closer checking and reduction of tolerances.

By setting the dial so the pointer reads the scale that corresponds with the wheel diameter, *instead of tire diameter*, measurements can be made according to the specifications furnished by the manufacturers. This insures accuracy when making corrections and adjustments.

Some of the features of the new aligner are: checks both camber and toe-in; squares front-end for gauging tracking; checks rear housing alignment; and gauges camber corrections. It also indicates bent axles and checks looseness and wear in bushings and bearings. Camber readings can be made on both wheels at the same time.

For correcting the camber angles, the aligner is used in conjunction with the Bear Axle Press so the operator can check the camber adjustment simultaneously on both wheels as the operation is performed. The aligner gauge is designed specially for this operation and will automatically register on each dial how much to bend the axle while pressure is applied. This feature also applies to toe-in corrections which are made with gauge in position.

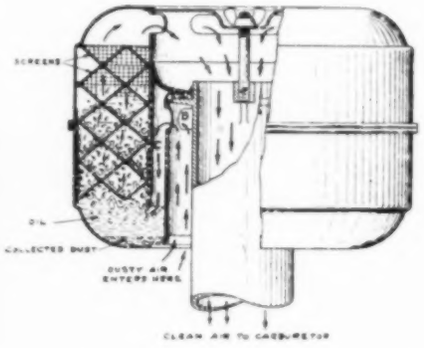


The Bear Wheel Aligner is made in several models to fit all makes of cars and trucks, whether equipped with wood, wire or disc wheels, high pressure or balloon tires, two or four-wheel brakes. Write to Bear Mfg. Company, Rock Island, Ill., for further details and prices; also for a free copy of their "Wheel and Axle Manual" which will be sent without obligation, if you mention this publication.

NEW STUFF *for* ROAD *and* SHOP (*Continued*)

Oil-Washed Air Cleaner

A NEW model of the Donaldson Oil-Washed Air Cleaner has been recently announced. It is designed for use on trucks, buses, passenger cars and power units of the automotive type.



This cleaner washes the dust from the air by directing the incoming air directly into the oil in the reservoir, by passing the air through oil sprays above the reservoir and between the screens and by passing the air through a series of oil-covered screens.

Claims of the maker are that it is highly efficient with a very low air restriction; self-washing and non-clogging; quenches backfire flames; silences air intake; has large capacity for dust; compact in size and easily installed.

That's about all we can say about it, but if you are interested further, the manufacturers will be glad indeed to send full details and prices. Write to Donaldson Co., Inc., 666 Pelham St., St. Paul, Minn., mentioning this publication, please. The Editor will be glad to get the dope for you, if you prefer.

Carter Carburetor Tool Kit

THE Carter Carburetor Corporation, of St. Louis, has placed on the market a new Carburetor Tool Kit designed especially to service all models of the Carter Carburetor with which more than 10,000,000 cars have been equipped.

According to the manufacturer, all tools in this kit are made of vanadium steel or better, chromium plated. No expense has been spared in design or quality.

The tools are packed in an attractive metal container made of 22 gauge steel with olive drab finish. Ample space is allowed in center compartment for additional tools.

For details and price address: Carter Carburetor Corp., St. Louis, Mo. You'll mention this publication, won't you?

Valve Insides Stocked Easily

THE Dill Manufacturing Co., Cleveland, Ohio, makers of tire valve parts and accessories, announces a product that is different from anything else on the market. It is the "Dill Jiffy Server" for valve insides. This new machine will be of unusual interest and importance to maintenance men.

The "Dill Jiffy Server" dispenses Dill No. 100 AA Super-Seal Valve Insides, by clipping them off, one at a time as they are needed, from "cartridge rolls." A roll of 100 valve insides fits the machine.

Dispensing valve insides with the new machine is handy, quick and economical. Because valve insides can be clipped off just when needed, waste of stock is prevented. And because each valve inside is hermetically sealed in an individual "cartridge," stock is protected from dirt and grease and always kept fresh and clean.

Patent Pending
DILL VALVE INSIDE "Jiffy Server"
Push down lever to clip off hermetically sealed valve inside.
Push up lever and another valve inside is ready to be clipped off.
Valve Insides in rolls, each valve inside hermetically sealed in an individual package.

The new "Dill Jiffy Server" has already won wide acceptance among rubber companies, garages, tire repair shops and the fleet trade. Complete information, including prices, can be obtained from the Dill Mfg. Co., Cleveland, Ohio, or the Editor.

New Toledo Valve Catalog

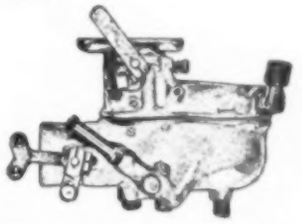
A NEW valve catalog has been issued by The Toledo Steel Products Company, manufacturers of Toledo "Super-Forged" Guaranteed Valves and Toledo Blue Print Bolts and Bushings.

In addition to the usual alphabetical listing by makes of cars, trucks, busses, taxi cabs and tractors, this catalog has several new features. It contains a master numerical list indexed by stock numbers and types, a numerical dimension chart indexed by stock numbers, a progressive dimension chart and a loose leaf price list.

It may be obtained on application to The Toledo Steel Products Company, Toledo, Ohio. You'll mention FLEET OWNER, won't you?

New Simmons Carburetor

AFTER several years of experimental work, the Simmons Manufacturing Company, Cleveland, Ohio, has developed a new plain tube carburetor for use on Chrysler, Dodge, Essex, Hupmobile, Oakland, Pontiac, Oldsmobile, Plymouth, and Whippet cars.



Among the features claimed for this carburetor are three jets in the power range, two fuel adjustments, one for idling and one for high speed operation, power step-up at full throttle. It gives power consistent with economy, smooth idling, and rapid acceleration, the makers state.

The carburetor is cadmium plated inside and outside, making it entirely rust proof, according to Simmons Mfg. Co., Cleveland, Ohio, who will be glad to send full details on request. You'll mention FLEET OWNER won't you?

"Braking" a New Manual

THE Raybestos Division of Raybestos-Manhattan, Inc., Bridgeport, Connecticut, have just issued a booklet entitled "Braking," an official manual prepared by Raybestos covering 100 questions and answers on asbestos, brakes, brake lining recommendation, brake service problems and other timely and helpful suggestions that will be of much assistance to fleet service stations and brake mechanics in general.

The Raybestos Division will be glad to furnish a copy of this book without charge to anyone who writes direct to them, care of their Advertising Department. You'll mention FLEET OWNER, won't you?

Bates Starter Gears

THE Bates-Wohlert Company, Lansing, Mich., (formerly the Bates Tractor Company) offers fleet owners a line of replacement flywheel starter gears for all cars, trucks, busses and automotive vehicles.

The material used in these gears is of particular interest, being a special alloy developed jointly by the Reo Motor Car Company (we understand) and the Bethlehem Steel Company. The steel comes from the mills in bars which are cut to length, rolled and flash-welded, when they are then automatically machined, chamfered, inspected, cleaned and marked.

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